NEW JERSEY

Life, Industries and Resources of a Great State

NEW JERSEY STATE CHAMBER OF COMMERCE

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Life, Industries and Resources
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WORLD WAR MEMORIAL, EDGEMONT PARK, MONTCLAIR

Dedicated Nov. 11, 1925. Raymond M Hood, architect, Charles Keck, sculptor.

The beauty and expression of this memorial have elicited much favorable comment from both American and European authorities.

NEW JERSEY

Life, Industries and Resources of a Great State

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NEW JERSEY STATE CHAMBER OF COMMERCE
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Foreword

THE New Jersey State Chamber of Commerce dedicates this volume to the citizens of New Jersey in the hope that a brief but vital story of the life, industries and resources of the State will stimulate interest in our present opportunities and responsibilities.

Washington spent two and one-half years of the Revolution on New Jersey's bloodstained soil. Emergencies have always developed men to meet them and thus in every national crisis the State has borne its full share of the burden. Men of all races and creeds have united to make its people sturdy and resourceful. We stand on the threshold of great events. The tread of marching millions soon to be added to our population is already heard. Our problems require the leadership of men able to see into the future and willing to make sacrifices for the common good.

Transportation, water supply, housing and education must be dealt with on broad and adequate lines. Industrial and residential areas must be properly defined. Our dreams of the future must be converted into the achievements of the engineer. Our desire to make life better for all people must crystallize into action based on accurate knowledge of conditions and needs. We must preserve the sacred traditions of the past, and in guarding its heritage, plan for a greater future.

We confidently believe that today is better than yesterday and that tomorrow will be better than today. Faith, vision and courage on our part will produce if not an ideal State, one of which we may well be proud. To this end the officers and directors of the State Chamber pledge their united efforts and urge upon all the importance of cooperation in advancing the interests of New Jersey.

WILLARD I. HAMILTON,
President.

c. 1

ACKNOWLEDGMENT

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Members of the Faculty of Rutgers University—Prof. E. E. Agger, Director, Bureau of Economics and Business Research; Dr. Jacob G. Lipman, Dean of the College of Agriculture and Director of the State Agricultural Experiment Station, and his staff of scientific experts; E. H. Rockwell, Dean of the School of Engineering; Irving Kull, Asst. Professor of History; G. H. Brown, Professor of Ceramics; H. McD. Clokie, Asst. Professor of Government; C. S. Crow, Professor of Education; Henry Keller, Jr., Professor of Economics; J. V. Emelianoff, Professor of Research; Eugene Greider, Professor of Economics; A. C. Hawkins, Professor of Geology.

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Illustrations

The New Jersey State Chamber of Commerce acknowledges the aid received from photographers, public officials, chambers of commerce, utility companies, manufacturers and others who have assisted in procuring and furnishing the illustrations. Fully half of the photographs did not indicate the name of the photographer, hence credit for them cannot be given. Many photographs were taken specially for this book. The photographers represented include —Potter Studios, Newark; Harvey W. Porch, Bridgeton; J. Eickenbush, Newark; Drew B. Peters, Newark; Underwood & Underwood, New York; U. S. Navy Official Photographer, Lakehurst; Orren J. Turner, Princeton; George A. Wonfor, Camden; Belden & Co., Newark; Aero Service Corp., Philadelphia; Reid Studio, Paterson; Wells Studio, Montclair; Fred Hess & Son, Atlantic City; Amagraph Co., Jersey City; Teich & Co., Chicago; Newark Photo Studio; Merritt E. Gregory, Morristown; R. H. Rose & Son, Princeton; Ventnor Photo Service; Erna Commercial Photo Co., Jersey City; Curtiss Photo, Morristown; Prickett, Burlington; W. H. Hoedt, Philadelphia; Geo. H. Pound, New Brunswick; Mitchell Studio, Mt. Holly; Atlantic Photo Service, Atlantic City; Morris Rosenfeld and Albert Rothschild, New York.

PREFACE

THERE is real need in America for a wider and more complete understanding of the life, resources and industries of the different States. While the people of our country are bound together by one national Government, we are divided by the boundaries of 48 separate and distinct commonwealths. Our habits and thoughts are influenced by such natural endowments as climate, topography, water, minerals and timber. Citizens of Florida, New Jersey, Montana and Utah cannot all have the same viewpoint. We are part of our environment, and it varies from semi-tropical to snow-bound—from sea level to the high altitudes of the Rockies.

Not only do we suffer from a sectionalism that limits our appreciation of the problems of our neighbors, but we are sadly deficient in our knowledge respecting the noble traditions, advantages and opportunities of the particular State in which we reside. What of its great industries that send their products throughout the earth; its recreational advantages that add to the joy of living; its humanity as evidenced by devotion to the welfare of its needy; its romances, shrines and charms; its great systems of education, finance and transportation; and its intelligent development of a sound and modern agriculture to serve as a firm foundation for an enduring prosperity.

It is to supply information of such a character that this practical outline of New Jersey's past and present activities has been prepared. The book is the work of the business leaders of New Jersey, who used their State Chamber of Commerce as an instrument to make the dream a reality. The result is a volume that will fill a want never before satisfied. Interesting facts are here set forth to serve a variety of purposes, from education in home and school to reference and research in office and library.

The Bureau of Economics and Business Research of Rutgers University assisted in collecting much of the material for the volume. The hundreds of contributions were prepared and submitted by an equal number of public officials, special writers, economists and business executives. The chief job of the editorial staff has been to exclude repetition and to reduce the various articles to the space limitations prescribed by their relative importance. This was not an easy task because of the evident belief of the individual contributor that his subject was the most vital, and therefore should be treated at greatest length.

The editors are well aware that the attainment of perfection is impossible in the handling of a subject so inexhaustible. But their intimate knowledge of the immense amount of labor entailed in developing, in a single volume, the authentic story of a great State and its people, affords them no ground for apology. Aside from the local educational benefits the book provides, there is also the fact that this work represents a pioneering effort in the broad field of dignified State publicity. The volume is not only New Jersey's fulfillment of a desire to be understood and appreciated by her own people, but it is also her original way of inviting the attention of non-residents to the advantages and opportunities she offers.

It will be noticed by the reader that the text is particularly free of propaganda, individual puffs and rhetorical flourishes. The pronoun "I" appears almost not at all. The outcome of this definite policy of completely avoiding personalities, except those that are historical, carries out the original purpose of producing a book to render constructive educational service. Favoritism or bias has had no place in the work. Politics has been given no thought. If any description appears out of proportion to its relative importance the fault may be traced to a tardiness, perhaps unavoidable, at the sources of information.

But taken as a whole, the difficulties presented to the editors have been surprisingly few. There has been not only a common agreement on the desirability of producing such a volume, but a spirit of willing cooperation in

every quarter. These evidences of unselfish support provided the necessary encouragement to make the work pleasant and effective. The editors wish to express their full appreciation for the voluntary assistance extended by a small army of New Jersey's loyal citizens.

The chief burden of responsibility, from beginning to end, has been borne by Mr. George S. Burgess, Vice-President and Secretary of the New Jersey State Chamber of Commerce. Not only was the book his original idea, but to him goes practically all of the credit for presenting the story of the State in a fascinating manner in the form of pictures. Although rendering continuous assistance in a literary way, he found time to collect and complete the arrangement of the hundreds of views that illustrate the text. Professor E. E. Agger of Rutgers University was actively interested in the accumulation of material. Mr. Edward P. Hulse, for years technical critic for large publishing houses, gave invaluable time and attention to the condensation and editing of a mass of original manuscript.

If this finished volume proves to be a book of inspiration as well as information; if it builds faith and confidence in the great destiny of New Jersey; if it engenders thought, discloses opportunity and spurs initiative on the part of the individual citizen,—then the editors will be gratified and fully rewarded for all effort expended.

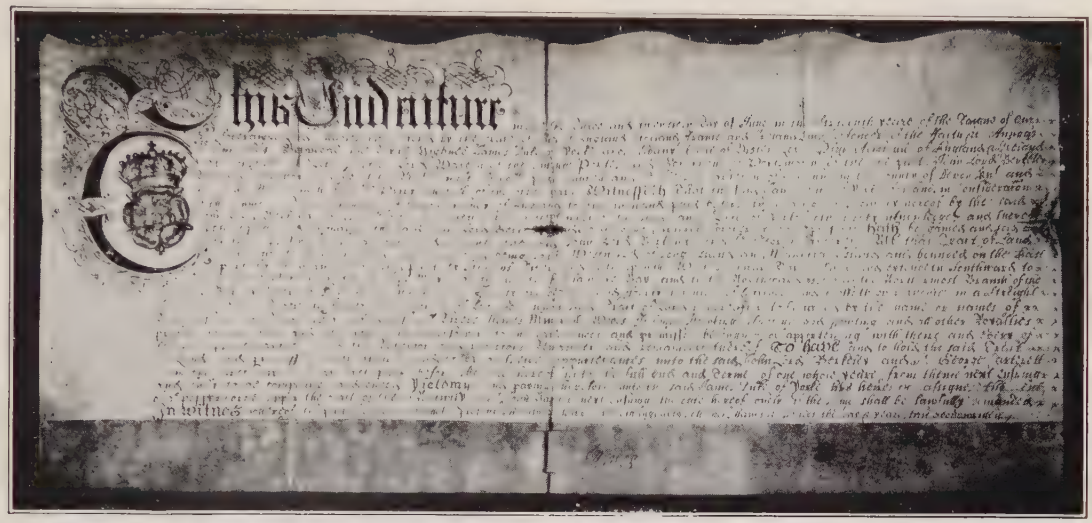
FLOYD W. PARSONS

New York, N. Y.,
December 1, 1928.

ORIGINAL LEASE OF NEW JERSEY

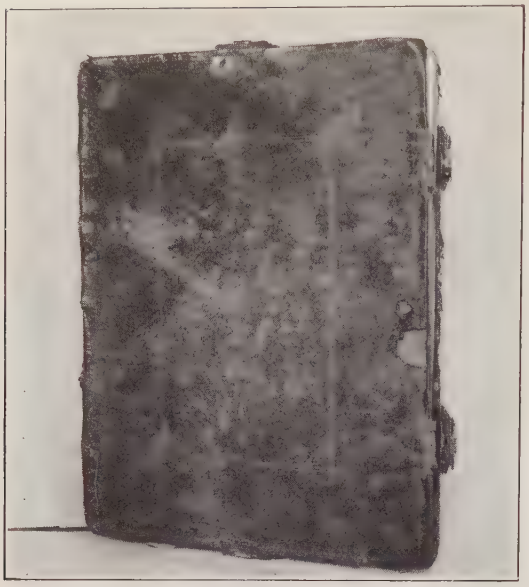
KING CHARLES II made a grant in 1664 to his brother, the Duke of York, afterward James II, of a tract extending from the Connecticut River to Delaware Bay. On June 23, 1664, the Duke of York leased that part of the tract which now is New Jersey to Lord John Berkley and Sir George Carterett,—friends of the King and prominent in his court.

The lease has been reproduced in fac-simile for this Book through the courtesy of Mr. Walter E. Robb of Burlington, who is its present possessor. Apparently the contents of this lease have not heretofore been published. A supplementary lease executed on the day following this one has been published, though not in fac-simile, but a comparison of the two shows that, while similar in form, the leases


This Indenture

TRANSCRIPT OF LEASE

This Indenture made the Three and twentieth day of June in the Sixteenth year of the Reign of our Sovereign Lord Charles the Second by the grace of God of England, Scotland, France and Ireland. King defender of the faith etc. Annoq. Dm 1664 Between his Royal Highness James Duke of York and Albany Earl of Ulster Lord High Admirall of England and Ireland Constable of Dover Castle Lord Warden of the Cinque Ports and Governour of Portsmouth of the one part. John Lord Berkley Baron of Stratton and one of his majesty's most Honorable privy council and Sir George Carterett of Saltrum in the county of Devon Knight and one of his most Honorable privy council of the other part. Witnesseth that the said James Duke of York for and in consideration of the sum of Tenne Shillings of lawful money of England to him in hand paid before the Sealing and Delivery hereof by the said John Lord Berkley and Sir George Carterett the receipt whereof the said James Duke of York doth hereby acknowledge and thereof doth aquitt and discharge the said John Lord Berkley and Sir George Carterett forever by these presents Hath bargained and sold and by these presents doth bargain and sell unto the said John Lord Berkley and Sir George Carterett all that Part of Land Adjacent to New England and lying and being to the Westward of Long Island and Manhattas Island and bounded on the East part by the main sea and part by Hudson's River and hath upon the West Delaware Bay or River and extendoth Southward to the Main Ocean as far as Cape May at the mouth of Delaware Bay and to the Northward as far as the Northermost Branch of the said Bay or River of DelaWare which is in Forty one degrees and Forty minutes of latitude and crosseth over thence in a Straight Line to Hudson's River in Forty one degrees of latitude which said Tract of Land is hereafter to be called by the name or names of New Ceasarea or New Jersey. And also all Rivers, Mines, Minerals, Woods, Fishings, Hawking, Hunting and Fowling and all other Royalties profits, commodities, Hereditaments whatsoever to the said landes and premises belonging or appertaining with them and every of their appurtenances and the Reversion and reversions Remainder and Remainders thereof To Have and to hold the said tract of land and premises with their and every of their appurtenances unto the said John Lord Berkley and Sir George Carterett from the First day of May last past before the date hereof unto the full end and term of One whole year from thence next ensueing and fully to be terminate and ended Yielding and paying therefor unto the said James Duke of York his heirs or assignes the rent of a pepper corne upon the feast of the Nativity of Saint John Baptist next ensuing the date hereof only if the same shall be lawfully demanded. In Witness thereof the parties aforesaid to this present Indenture have enterchangeably set their hands and Seals the day and year first above written.



THE BOUND VOLUME WHEN CLOSED

are not alike. The consideration of "tenne shillings" paid is not mentioned in the supplementary lease.

The transcript of the contents of this original lease does not conform to the quaint spelling and oddities of penmanship where they make difficult reading. Note the signature of "James,"—then Duke of York and afterward King James II. The lease is written on a sheet of heavy parchment about 12 inches from top to bottom and folded vertically and crosswise as shown by the breaks in the paper.

Concessions and Agreements

On these and succeeding pages are facsimile reproductions of that famous document of laws and religious liberty known as "The Concessions and Agreements of the Proprietors, Freeholders and Inhabitants of the Province of West New Jersey, in America."

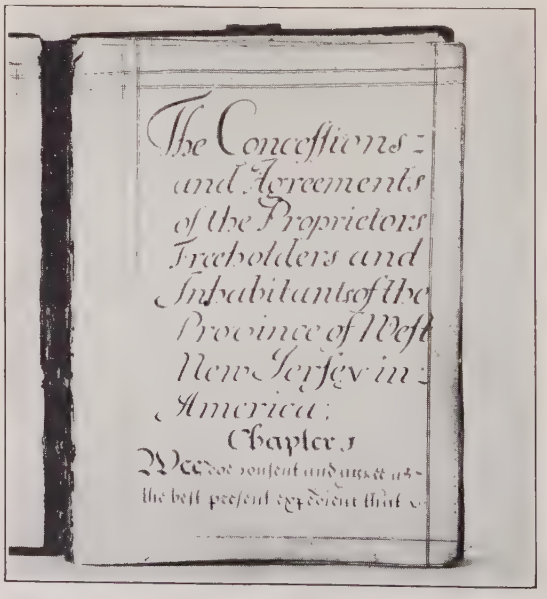
The Bill of Rights in the Federal Constitution, which came 113 years later, seems to have been based largely on this document.

These reproductions are from original photographs of the document in its present state of preservation in the vault of the Burlington City Loan and Trust Company. These photographs were taken for exclusive publication in this book through the courtesy of Mr. Walter E. Robb, who is President and Treasurer of the Council of Proprietors of West New Jersey.

This document of rare, historical value, though now in its 253rd year, is surprisingly well preserved, as attested by the clearness of these half-tones. The text of the Concessions and Agreements is in the hand-writing of the times yet, except in minor respects, the ink is not much faded and the pages may be read with little difficulty.

Though their contents were published about 1752, and again in 1881, in editions long since exhausted, these are the only facsimile copies that have ever been made, in so far as known.

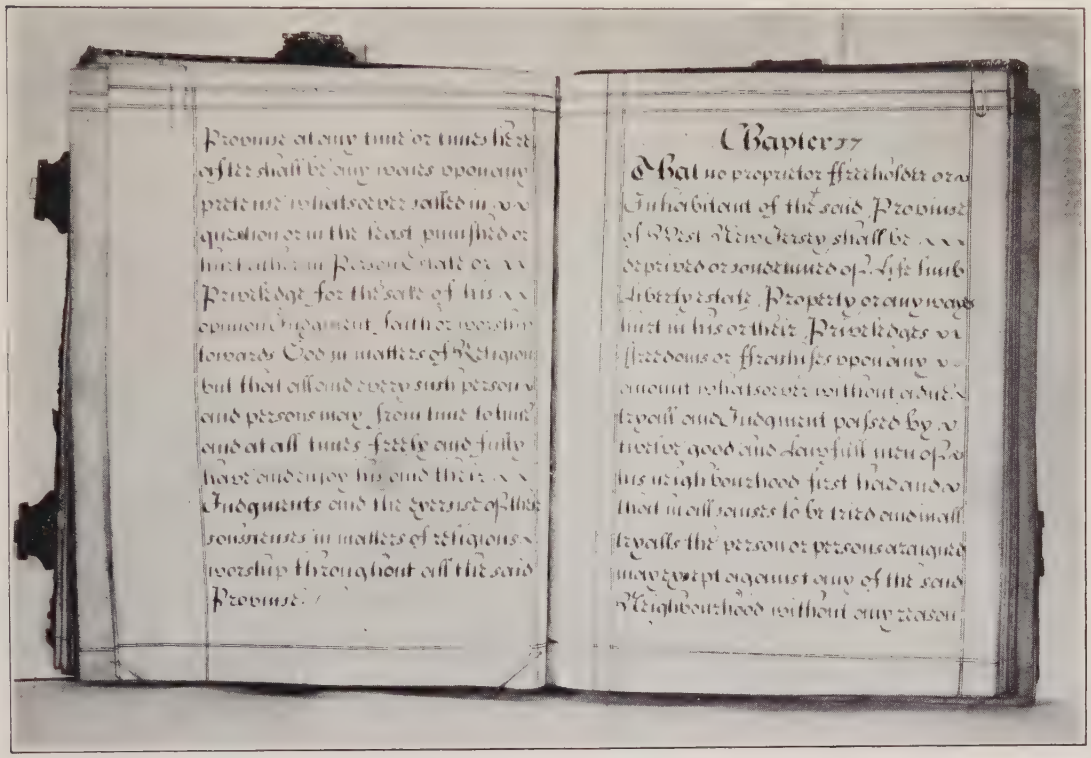
This document was drawn up and signed in England under date of March 3, 1676. It constitutes a set of laws, a plan of colonization, and the grant of rights and religious liberty to the colonists. There are 44 chapters, the last 32 being known as "The Charter of Fundamental Laws of West New Jersey," and these last are the basis of the present laws of the State of New Jersey. The document was bound in a volume as shown by the half-tones and was brought across the water to this country where it has since remained in the possession of the Council of Proprietors of West New Jersey—a body per-



TITLE PAGE AND BEGINNING OF CHAPTER I
"We do consent and agree, as the best present expedient, that . . ."

petuated by the lineal descendents of the first proprietors, who have inherited the shares that represented the original ownership of the lands of the colony and which to-day give their owners title to all lands which remain unclaimed or have not since been deeded to others.

When Edward Byllinge, a partner with John Fenwick in the early settlement of West New Jersey, became financially embarrassed in 1675, he assigned his interests to William Penn, Gawen Lawrie and Nicholas Lucas,—three Quakers who divided his interests into 100 shares, or proprieties, and from the sale of a portion of the shares received enough to pay Byllinge's creditors in full. The owners of these shares became the proprietors of the colony and they made these Concessions and Agreements under which it was governed. The Concessions became operative four months after they were executed, when Penn and his associates executed a deed with Carteret dividing the colony into East and West New Jersey,—Carteret retaining only the former.



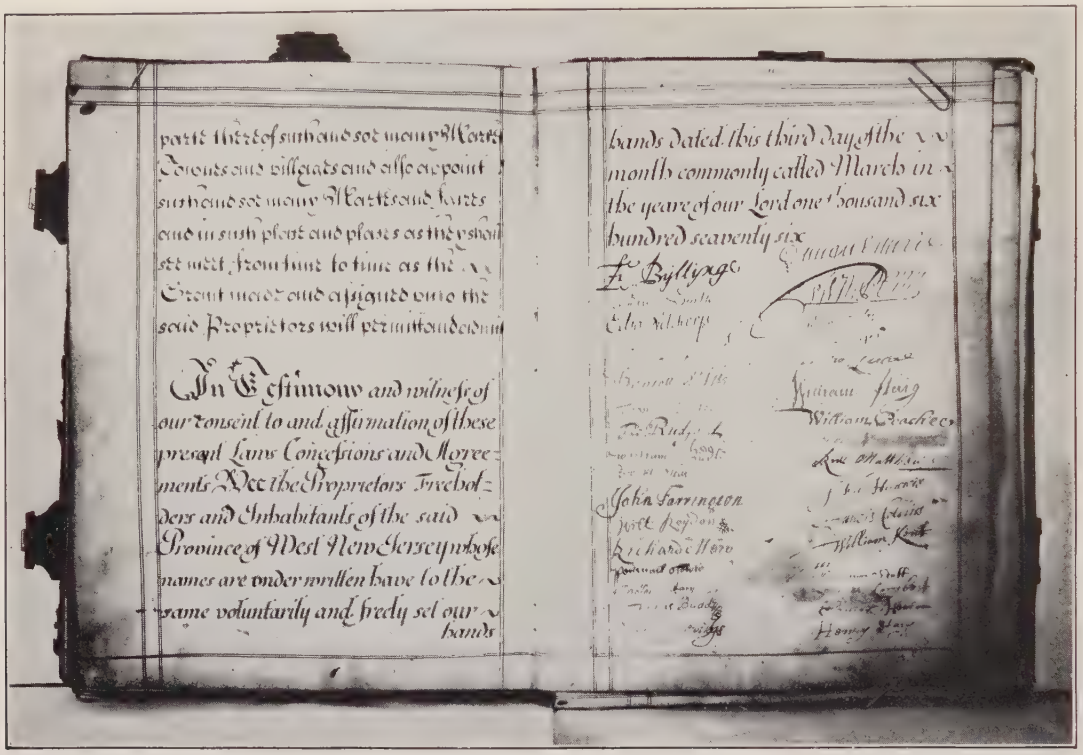
Chapter 16, on the left hand page, contains the grant of religious liberty. The chapter reads as follows, the words italicized being on the page ahead of the one shown in the illustration: "*That no men, nor number of men on earth, hath power or authority to rule over men's consciences in religious matters, therefore it is consented, agreed and ordained, that no person whatsoever within the said* Province, at any time or times hereafter, shall be any ways upon any pretense whatsoever, called in question, or in the least punished or hurt, either in person, estate, or privilege, for the sake of his opinion, judgment, faith or worship towards God in matters of religion. But that all and every such person, and persons, may from time to time, and at all times, freely and fully have, and enjoy his and their judgments, and the exercises of their consciences in matters of religious worship throughout all the said Province."

Chapter 17, on the right hand page, proclaims the right to trial by jury in these words, italicized words being those that complete the chapter on the succeeding page: "That no Proprietor, freeholder or inhabitant of the said Province of West New Jersey, shall be deprived or condemned of life, limb, liberty, estate, property or any ways hurt in his or their privileges, freedoms or franchises, upon any account whatsoever, without a due trial, and judgment passed by twelve good and lawful men of his neighborhood first had: And that in all causes to be tried, and in all trials, the person or persons, arraigned may except against any of the said neighborhood, without any reason rendered, *(not exceeding thirty five) and in case of any valid reason alleged, against every person nominated for that service.*"

At first there were two capitals of the West New Jersey Colony—one at Salem, and the other at Burlington. The Council of Proprietors—the governing body—was, and still is, comprised of five representatives from the Burlington Division of West New Jersey and four from the Gloucester Division of West New Jersey, these

being the two sub-divisions of the Colony. Burlington has always been the Seat of the Proprietors. Many early governors lived there, and the Concessions and Agreements have been kept there. The Surveyor General is their legal custodian and his office is in Burlington.

The meetings of the Council of Proprietors are held at the Surveyor General's office on the first Tuesday in February, May, August and November. A right of propriety consists in the ownership of a share, or a portion of one of the 100 shares, into which Edward Byllinge's interests in West New Jersey were divided.


In Testimony and witness of
our consent to and affirmation of these
present Laws Concessions and Agree-
ments We the Proprietors Freehol-
ders and Inhabitants of the said
Province of West New Jersey whose
names are under written have to the
same voluntarily and freely set our
hands
hands dated this third day of the
month commonly called March in
the yeare of our Lord one thousand six
hundred seaventy six
E. Byllynge
John Farrington
Richard Mew
William Penn
Henry Stacy

The text at the top of the left hand page is the last part of Chapter 44 and covers the distribution of the Province into shares, settlement of towns, and general colonization. The last part reads: "In testimony and witness of our consent to and affirmation of these present laws, concessions and agreements, we the Proprietors, freeholders, and inhabitants of the said Province of West New Jersey, whose names are under written, have to the same voluntarily and freely set our hands, dated this third day of the month commonly called March, in the year of our Lord one thousand six hundred and seventy six. E. Byllynge, Richard Smith, Edward Nethorp, John Penford, Daniel Wills, Thomas Ollice, Thomas Rudyard, William Biddle, Robert Stacy, John Farrington, William Roydon, Richard Mew, Percivall Towle, Mahlon Stacy, Thomas Budd, Samuel Jeninns, Gawen Laurie, William Penn, William Emley, Joshua Wright, Nicholas Lucas, William Haig, William Peachee, Richard Mathews, John Haracis, Francis Collins, William Kent, Benjamin Scott, Thomas Lambert, Thomas Hooton, Henry Stacy. *Note:* 120 additional signatures follow on next page of the document.

Chapter I

History and Government

GENERAL HISTORY

When the early Dutch and Swedish settlers arrived in the section of the New World now known as New Jersey, they found it occupied by the Lenni-Lenape, one of the tribes of the far-reaching Algonquin family, later known as the Delawares. Lenni means pure or original and Lenape means people, hence their name may mean "the first people." Moved by their human wants and needs, the Lenni-Lenape lived along the river valleys, and were more numerous in the southern and central than in the northern parts of New Jersey. Their total number in the State probably never exceeded one thousand. Although often seeking new fishing and hunting grounds, when settled for a while, they lived in villages. Their wigwams were not artistically conceived and were usually indescribably dirty. The girls, after reaching early womanhood, became coarsened by hard work and unattractive. Few marriages occurred between them and the white settlers, though many between Indians and negroes.

The Indians of New Jersey were hospitable, although in their relation to the white settlers they occupied an uncertain position. Sometimes they were treated by the Colonial Legislature as menials and again as equals. Generally speaking, the Dutch and Swedes were kindly disposed toward the red men, although there was constantly the cloud of racial jealousy overshadowing all transactions. They all cried "Peace" on approaching and called one another "Friend" and "Brother," but suspicion was much more real than any peace and friendship. Fortunately in New Jersey the situation never became acute except for a brief contest between the Dutch and the Indians before the English conquest, and the Indian massacres in Sussex County during the French and Indian War. The stories of extremely friendly relations between the Indians and some white families, particularly among the Quakers, are pleasing exceptions to the general condition.

During the quarter century of English colonization between 1664 and 1702, the governors were ever instructed to treat the Indians with all humanity and kindness—for it "will prove beneficial to the Planters and likewise advantageous to the propagation of the Gospel." Severe penalty was meted out to anyone who willfully killed an Indian. Because extreme care in procuring land titles when purchasing Indian land was always enjoined upon the colonists, practically all Indian title to land in New Jersey was extinguished before the Revolution.

In 1758, as an act of charity and also, as a matter of protection, the first Indian reservation in the United States was established in the "Pines" of Burlington County, New Jersey. There 200 Indians were settled upon 3,000 acres of land. Thence the Lenni-Lenape removed to New York State, later to Green Bay, Wisconsin, and finally to Indian Territory. Now, excepting in the retention of place names, corrupted by long usage, half-forgotten village sites and graves, a little Indian blood in a few New Jersey families, and scattered collections of their handiwork in stone, bone, and shell, no trace of the Lenni-Lenape remains in New Jersey.

It fell to the lot of the Swedes to demonstrate the possibilities of the Delaware Valley for permanent settlement, and also by their own misfortune to prove that no winning of the wilderness could be gained save by endless toil and unity of action. After 25 years of adventuring back and forth across the seas, between Scandinavia and the Delaware River, and enduring the persecution and inhospitality of the

English in Virginia and the Dutch roundabout, the Swedes finally in 1655 surrendered their rights on the Delaware River to the Dutch under the doughty Peter Stuyvesant.

Few if any permanent settlements had been made in this period. Their influence upon New Jersey history consists not so much in place names as in the strong course of blood which has held sway for two and a half centuries in many an old settled family in Salem City, in Swedesboro, and in the Maurice River Valley. There the effect of Swedish life and character appears in the physical and mental constitutions of men and women to this day. Their political surrender was most peaceful. They married, especially among English colonists. They shifted their religious interests to the Society of Friends or to Episcopalianism. By 1800 the Swedish was a dead language upon the New Jersey shore of the Delaware.

The Dutch, jealous like the Swedes of the other European powers who were getting a foothold upon the New World, tried their ships and men in the Seventeenth Century race for land and trade. Again, as for the Swedes, so for the Dutch, the interest in the occupancy of New Jersey was in comparatively small areas, with little effort to colonize whole sections. However, when the English navigator, Henry Hudson, returned to Europe in 1607 after sailing for a week in the Delaware Bay and River and landing upon Sandy Hook, (even before sailing up the "Great North River of New Netherland," later to bear his name,) the excitement in Holland was unbounded, particularly because of the quantities of fur-bearing animals reported. Before this, in 1498 Sebastian Cabot had sailed along the shores of New Jersey, and may have been the first white man to view the land. Following this English explorer, in 1524 Giovanni de Verrazano, an Italian navigator in the employ of the French government, anchored his vessel at Sandy Hook, according to his records, and spent three days on the high lands near the shore.

In 1614 the Dutch established themselves under authority upon Manhattan, and in 1623 Captain Cornelius Jacobse Mey built Fort Nassau near Red Bank and named the north cape of Delaware Bay for himself, now Cape May. Their settlement of the Delaware River section was fragmentary and inefficient, save in driving out the Swedes.

The Dutch settlement of the New Jersey shore of the Hudson River was more lasting. In the locality called Hoboken-Hackingh, "the place of the tobacco pipe," the Indians and fur traders met to trade gewgaws for peltries. In 1643 attempts at agriculture centered around the farm house and brew house of Aert Tennissen Van Putten, north of Hoboken, but the forbidding river-front led to the later and more active growth of her neighbor, Jersey City. For many years, a small colony in this latter section, then called Paulus Hook, thrived as a trading and farming community. The site of the little trading hut of Michall Paulusen, where he purchased furs from the Indians in 1633, lies nearly 1000 feet to the west of the present ferry house, the river having been filled in to that extent.

In 1660 the town of Bergen, now Jersey City Heights, was established. A fort was erected. Here there was established the first religious congregation in New Jersey under the Dutch Reformed Church. To the Hollander is due the credit for establishing the principle of purchasing the Indian title to land and for planting his church and his schools wherever he went. But by 1660, with the advent of the efficient English colonizers, the conquerors found New Jersey, through wise government, quite ready to change masters.

For some years England had looked upon New Netherland with longing eyes. To have the settlements along the Atlantic Coast from northernmost Massachusetts to the most southern point of the Carolinas homogeneous and English seemed only proper. In 1664 the easy-going Charles II, who always looked upon anything desired as his own, issued a patent to his brother James, Duke of York, for all the lands between Cape Cod and the Hudson River as well as all the land between the Connecticut River and the east side of Delaware Bay. These grants took in much of what are now New England, New York, and New Jersey. Immediate preparations were made for a military invasion to subdue the Dutch. In August of that year a small English fleet anchored off

PRINCETON BATTLEGROUND

Coney Island, and without bloodshed the English colors were soon raised over the fort at New Amsterdam, hereafter known as New York for the King's brother. In this conquest, New Jersey, until this time known only as a part of New Netherland, was formally recognized for the first time in colonial history as a dependency of the British Crown.

Even while the squadron of conquest was on the high seas, James, Duke of York, made over to two loyal adherents—John Berkeley, Baron of Stratton, and Sir George Carteret—all that portion of his acquisition bounded on the east by the main sea and the Hudson River and on the west by Delaware Bay and River to be called "New Caesarea or New Jersey," in honor of Sir George Carteret's defense in 1649 of his native Isle of Jersey in the English Channel against the Cromwellian Parliamentarians.

And so these two, "true and absolute Lords Proprietors of all the Province of New Caesarea or New Jersey," found themselves owners of a vast tract of land, its great river fronts sparsely settled by Dutch and Swedes and wandering bands of Indians, and with it the great problem of colonization as yet unsolved. Early in the Seventeenth Century, Queen Elizabeth had granted Virginia to Sir Walter Raleigh, and New Jersey was included in this great tract. When Berkeley and Carteret came into possession of this land, the present State of New Jersey was in both Virginia and New York, but the claims of Virginia were withdrawn.

Back in England were many men dissatisfied with king, church, and society, waiting for an invitation to "come on over." In April, 1665, Philip Carteret, a relative of Sir George, landed at a point in New Caesarea which he called Elizabethtown, in honor of the wife of Sir George Carteret, and called himself the first governor. Before him there came within the next two years the settlers already in New Jersey—33 from Bergen, 65 from Elizabethtown, 13 from Woodbridge, 24 from Navesink, two from Middletown and likewise two from the Delaware—and subscribed to the oath of allegiance to King and Lords Proprietors.

Word had already reached New England of

WASHINGTON'S HEADQUARTERS AT MORRISTOWN

General and Mrs. Washington spent the winter of 1779–1780 in this house, most famous of all of Washington's Headquarters. Now owned by the Washington Association of New Jersey and maintained as a Colonial Museum.

the plans for New Jersey, and the Congregational churches sent a committee headed by Robert Treat down to Governor Carteret to examine the advantages offered here. So in May, 1666, the New Englanders "with their families, their beloved pastor, their church records and communion service, their deacons, and their household goods," arrived in Newark, thus marking the type of settler that should come to East Jersey. The East Jersey settlers were God-fearing Calvinists, Congregationalists, and Presbyterians. In Newark only members of the Congregational Church had any political recognition. Land including Newark, Belleville, Bloomfield, and the Oranges was soon purchased from the Indians. To the first assembly, which met in Elizabethtown in May 26 to 30, 1668, came burgesses from the settlements already named.

Nearly 10 years after the first Governor, Philip Carteret, named Elizabethtown in East Jersey, the story of West Jersey began. On March 18, 1674, John Fenwicke, Quaker, purchased from Lord Berkeley for himself and his Quaker friend, Edward Byllynge, Berkeley's half interest in the western part of "Jarsey," for a price a little less than $5000. Their object was the creation in America of a haven of religious and political freedom for the oppressed Society of Friends, and thus West Jersey, and not Pennsylvania, is the oldest Quaker colony in America.

At the front of the movement stood William Penn, the most noted convert of the Society. His energy and enthusiasm were unlimited, and under his influence two land-purchasing and colonizing associations were formed in England, one composed of Friends in Yorkshire, the other of members of the Society in London. Penn became a proprietor. He settled land disputes between other proprietors. He drew the line of partition between the two Jerseys from Little Egg Harbor on the Atlantic Coast, from the southern end of what is now Long Beach, to a point on the Delaware River. East of this line was East Jersey, the property of Carteret, and west of it was West Jersey, the property of Penn and his Quaker associates.

To Penn is credited also the authorship of the "Concessions and Agreements of the Proprietors, Freeholders and Inhabitants of West New Jersey in America," a most democratic document giving to the future settlers all local governmental powers, trial by jury, and religious freedom, reserving for the proprietors merely the shadow of government. To the emigrants these dear liberties were promised as well as an abundance of land, and West Jersey offered rare advantages. The Delaware, open to the sea, suitable for trade by the largest ships, received many sluggish tributary streams, with banks that were loamy and fertile. Easily tilled plains, short winters, long summers, a supply of timber, as well as quantities of wild game, promised a less rigorous life than the East Jersey section around Elizabethtown.

John Fenwicke, with his family, relatives, servants, and a company of settlers, arrived in Delaware Bay on the ship "Griffin" or "Griffith" in the month of June, 1675. Although for three years Fenwicke was heckled by Governor Andros of New York, covetous of West Jersey for the Duke of York, still other Quaker settlers came by shiploads, and their enthusiastic letters written back to England brought still more. Fenwicke's colony settled Salem.

In the autumn of 1677 the ship "Kent" with 250 passengers entered the Delaware and proceeded slowly north to the site of Burlington, where settlement was made. In 1677 and 1678 new shipments arrived.

Whereas East Jersey was disturbed more or less by conflicts with Governor Andros over in New York and by political and land disputes, the beginnings of West Jersey were marred by few disturbances. Burlington was made the capital, with courts there and at Salem. The Quaker settlers spread east as far as the pine barrens, a forest impenetrable even to the Indians except for hunting. Checked on the east, from Salem they spread south to the Cohansey, settling Bridgeton and Greenwich. For just 27 years West Jersey existed as a separate colony. In spite of her peace-loving settlers there had been bickerings for the last 10 years of the period, between the proprietors themselves, with the people, and with the Crown. Both Jerseys had been bullied by the English Governors of New York; and finally, worn out by the strife, the proprietors of both East and West

QUEEN BUILDING, RUTGERS UNIVERSITY, AT NEW BRUNSWICK, ERECTED 1809

Jersey surrendered their rights of government to Queen Anne on April 17, 1702, and were united into one colony under a government appointed by the Crown.

Governor Cornbury, appointed in 1702 by Queen Anne to rule for her the united colony of New Jersey, early showed himself unsympathetic with the rights of the people. The popular sentiment against him lasted until he departed five years after his arrival. But the evil he did lived after him and paved the way for the growth of a definite spirit of resistance, first directed against the royal governors and then against the Crown itself.

Governors came and went—some good, some bad. There was always friction between the Governor and his council upon one side and the House of Assembly on the other, and only a portion of the people, because of property qualifications, was granted the franchise to choose their Assemblymen. The Governors always surrounded themselves with representatives of the landed interests of West Jersey and the wealthy merchants of East Jersey. Usually a Church of England man was the chief executive, unsympathetic toward the Calvinists of East Jersey, but usually supported by the Society of Friends. Nor were the Governors at fault for all unhappy conditions. They had to bear the odium of enforcing the laws of the home government, which looked upon the transatlantic colonies usually as a source of revenue. The colony's roads were poor, its trade was hampered, and the loyalty of men of affairs became shaken—until in 1775 it meant revolution.

The first 75 years of the Eighteenth Century were years of growth and adjustment in the colony. Farming was the chief economic interest. Practically the whole population lived on farms, or if a man lived in a town, he owned a farm. The training of the women and girls as well as of the men was for farm life, and their work was not lightened by modern conveniences.

The typical farm in East Jersey was small, while that of West Jersey, because of level and uninterrupted acreage, was large. Owing to this condition, in West Jersey slaves were particularly useful and were widely held and employed

in spite of the precepts of John Woolman. Shipbuilding flourished up and down the Delaware. From Perth Amboy and Salem, yachts, schooners, and larger craft entered and cleared for every seacoast town from Boston to Charleston. The whaling industry led to the settlement of Cape May, Atlantic, and Ocean counties. By the use of the Indian canoes up and down the rivers, and the use of the slaves' backs to carry the master through the wilderness, transportation developed by 1775 into a network of rough roads connecting different sections of the colony.

As the storm of the great revolt gathered throughout the colonies, we read the pathetic story of New Jersey's last Royal Governor, William Franklin, only son of Benjamin Franklin. Loyalty itself, he could not sanction the measures passed by the New Jersey Assembly, following in the steps of her neighbors. He could only warn his people that anarchy and confusion would destroy the blessings of their civil society. At last, those Assemblymen, who had been lavishly entertained at his model farm on the Rancocas, and at Perth Amboy, and to whom he had endeared himself in many ways, arrested him and as "delicately as may be" transported him to the care of the Governor of Connecticut, a Whig.

In the autumn of 1772, New Jersey caught the spirit of Massachusetts in the inauguration of township and county committees of correspondence. At first these committees were only centers of political organization of each locality, but gradually they assumed greater power, until by 1776 they were the means of authority for preparing for the momentous struggle. They established markets, encouraged the home industry of spinning and weaving, regulated prices, and arranged to forward powder, saltpeter, and other supplies to the army. Down in Greenwich on the Cohansey, a shipload of tea was burned in 1774 nearly as dramatically as at the Boston Tea Party. These were spurts of popular feeling, amid the considerable Tory sentiment which was to be found in New Jersey.

COOPER HOME, AT CAMDEN

Stone section built, 1634. Section in rear built of imported English brick in 1707. Cooper family settled northern Camden. Kaighn family settled southern Camden.

MONUMENT TO THE DESPATCH RIDER—THE "PAUL REVERE" OF NEW JERSEY
Old burying ground of First Presbyterian Church, at Main Street and Scotland Road, Orange

The years of the Revolution brought more passings of both armies across the State and more battles fought than in any other of the thirteen colonies. Nearly 100 battles, large and small, were staged on New Jersey soil. Through the earlier years of the Revolution, New Jersey bore the brunt of the gigantic struggle for the control of the valleys of the Hudson and the Delaware. On June 23, 1775, General George Washington, who was destined to spend much of his military life here, paid his first official visit to the colony on his way from Philadelphia to Boston. When near Trenton he was met by a carrier with the news of the battle of Bunker Hill.

That loyalist regiments should be formed in New Jersey was to be expected. Their religious scruples as well as their economic prosperity under existing conditions meant that the Quakers would disapprove of any war. Wealthy merchants and many of the socially prominent in Trenton and Newark, as well as Burlington and Perth Amboy, Episcopalians, leading lawyers of the State, members of the Governor's Council, Hollanders in the Hackensack and Passaic valleys, were loyal to England. The official loyalist regiments operated largely in guerrilla warfare from Staten Island and New York and up the easily accessible river valleys, like the Passaic, Hackensack, and Raritan. The "Pine Robbers," a disjointed band of land pirates, were associated with the loyalists, although the loyalists often shuddered at the horrible deeds plotted in the recesses of the "Pines" by these "robbers."

When Lord Howe took possession of New York City later in 1775, Washington wrote General Lee that in his opinion Howe had "designs upon the Jerseys." And so it proved. Crossing to New Jersey the American troops were soon scattered from Fort Lee, and Washington's retreat across New Jersey began, lest he be cut off by the English possibly at the Raritan. The two armies, one ragged and disordered, the other disciplined and triumphant, crossed the State so closely that they could hear one another's music, but without an engagement.

Through Newark, New Brunswick, Princeton, and Trenton, leaving English and Hessians in comfortable quarters all along the way, Washington and his troops moved across to the bluffs above Philadelphia. From this point, a few weeks later, on Christmas night, Washington and his troops made the memorable crossing of the Delaware and surprised the English at Trenton, defeating them without the loss of a man in the Colonial army. This was followed by another victory at Princeton, where the loss of American officers was large and most unfortunate. These two battles, in their influence upon popular sentiment, quite saved the day. They blotted out all the taunts and fears the poor little army had aroused in its "retreat" a month earlier.

Then followed Washington's winter in Morristown with his army. Poorly nourished, poorly clothed, and with a thousand down with smallpox, the army was hardly refreshed by spring, when Lord Howe crept around to Philadelphia by sea and seized the city, to Washington's real surprise. The summer of 1777 meant little advance for Washington's plans and was followed by the horrors of the winter at Valley Forge.

Early in the spring of 1778, the British started their evacuation of Philadelphia. Washington and his army followed them and their 12-mile baggage train across New Jersey on their way to New York, until the famous engagement at Monmouth took place on June 28th. The Americans were victorious, and Washington wrote that after two years' maneuvering, "both armies are back to the very point they started from, and that which was the offending party in the beginning is now reduced to the use of spade and pickaxe for defense." Then came a winter with Washington at Somerville, and a second winter at Morristown, and in between were many difficult problems, smaller engagements and considerable trouble with the Indians in the summer of 1778. However, with the battle of Monmouth ended the extensive operations for the control of New England and the Middle States. Henceforth it was the southern Commonwealths which were to feel the brunt of the war.

In June, 1783, the Continental Congress adjourned from Philadelphia to Princeton. There

it prepared the Berrien house for General Washington at Rocky Hill, of which he took possession on August 24th. Two days later he rode the five miles to Princeton, where he was welcomed with dignity by Congress in Nassau Hall of the College of New Jersey. In the chapel of the college, the first authentic account of the conclusion of the definitive treaty between Great Britain and the United States was received. From the Rocky Hill headquarters on Sunday, November 2, 1783, Washington delivered his farewell address to the armies. His baggage was ordered to Mount Vernon, and General Washington departed for West Point, leaving New Jersey, where he had spent two and a half years of the eight years of the Revolution.

PRINCETON BATTLE MONUMENT
One of America's most impressive memorials

For several years New Jersey worked desperately to secure the National Capital, but to no avail. In 1799 Congress convened in Trenton temporarily, only because there was yellow fever in Philadelphia.

At the end of the war the Articles of Confederation, created in times of stress, failed to hold the separate colonies in time of peace. All jealous of one another, the smaller states were bullied by the larger ones. The Articles had neither power to levy taxes nor to regulate trade, and New Jersey refused to pay her quota of $136,000. Some call this act the deathblow to the Confederation. Accordingly, when steps were taken for the colonies to consult together in order to strengthen the Federal Government, New Jersey was aggressively active.

At a national convention, held in Philadelphia in 1787, New Jersey and Delaware were opposed to the limitation which proportional representation would give them, the smaller states. Thus it was that William Paterson, one of New Jersey's illustrious delegates, laid before the other delegates the "New Jersey Plan," which though finally defeated, furnished in compromise some of the most important elements in the Constitution. When the Constitution was completed in September and submitted to the several States for ratification, it

CHURCH AT SPRINGFIELD WHERE THE "FIGHTING PARSON" TORE UP THE BIBLES AND HYMN BOOKS AND USED THE PAGES FOR WADDING OF THE GUNS OF THE AMERICAN ARMY DURING THE BATTLE OF JUNE 23, 1780

MONUMENT AT GREENWICH TO THE PATRIOTS OF CUMBERLAND COUNTY WHO BURNED THE TEA DECEMBER 22, 1774

was entirely acceptable to the people of New Jersey. In 1776 New Jersey had worked out and adopted a Constitution which was a powerful factor in developing a feeling of loyalty in the State.

On April 6, 1789, the choice of the people fell upon George Washington as the first President of the United States, and he was called to meet Congress in New York City. His route from Mount Vernon to the metropolis was that of a conqueror, and in New Jersey the enthusiasm of the people was high.

With the inauguration of the National Government, New Jersey stood stanchly Federalist, but by the turn of the century, considerable republicanism with the dissemination of the French Revolution's fraternity, liberty, equality, and the spread of Methodism through the State, had seeped into certain sections. When in 1812 the clouds of war with England again arose, New Jersey, lying between Philadelphia and New York, two great prizes for the British fleet, was opposed to war. Of course the Friends were peace lovers for ethical reasons, but another wing of the peace party was made up of New Jersey's growing body of manufacturers, common carriers, and merchants, to whom war meant disaster. However, to the call of Congress for the raising of state militia, New Jersey's response was hearty and prompt, and during the three years' war the State furnished 400 officers and over 5,000 non-commissioned officers and privates.

Former Governor Bloomfield was prominent as Brigadier General in the United States Army. In the navy, William Bainbridge, a native of Princeton, who commanded the "Constitution" when it took the British ship "Java," and the famous James Lawrence, born at Burlington, by their courage and accomplishments, possibly made up for any seeming lack of loyalty in the State. Lawrence, as he was carried below on the defeated "Chesapeake," gave the navy its motto in his dying cry of "Don't give up the ship."

New Jersey's problems in the war were the protection of Philadelphia and New York and her own coast. Blockhouses built on Sandy Hook and the Navesink Highlands were of aid to New York. No engagements took place on New Jersey soil, but there were several in her rivers and bays. Although her record during the war was that of efficiency and responsibility, the treaty of peace brought real relief to this State of many navigable waters, many ships, and much trade.

One result for New Jersey of the War of

WHERE THE TEA WAS FOUND STORED AT GREENWICH

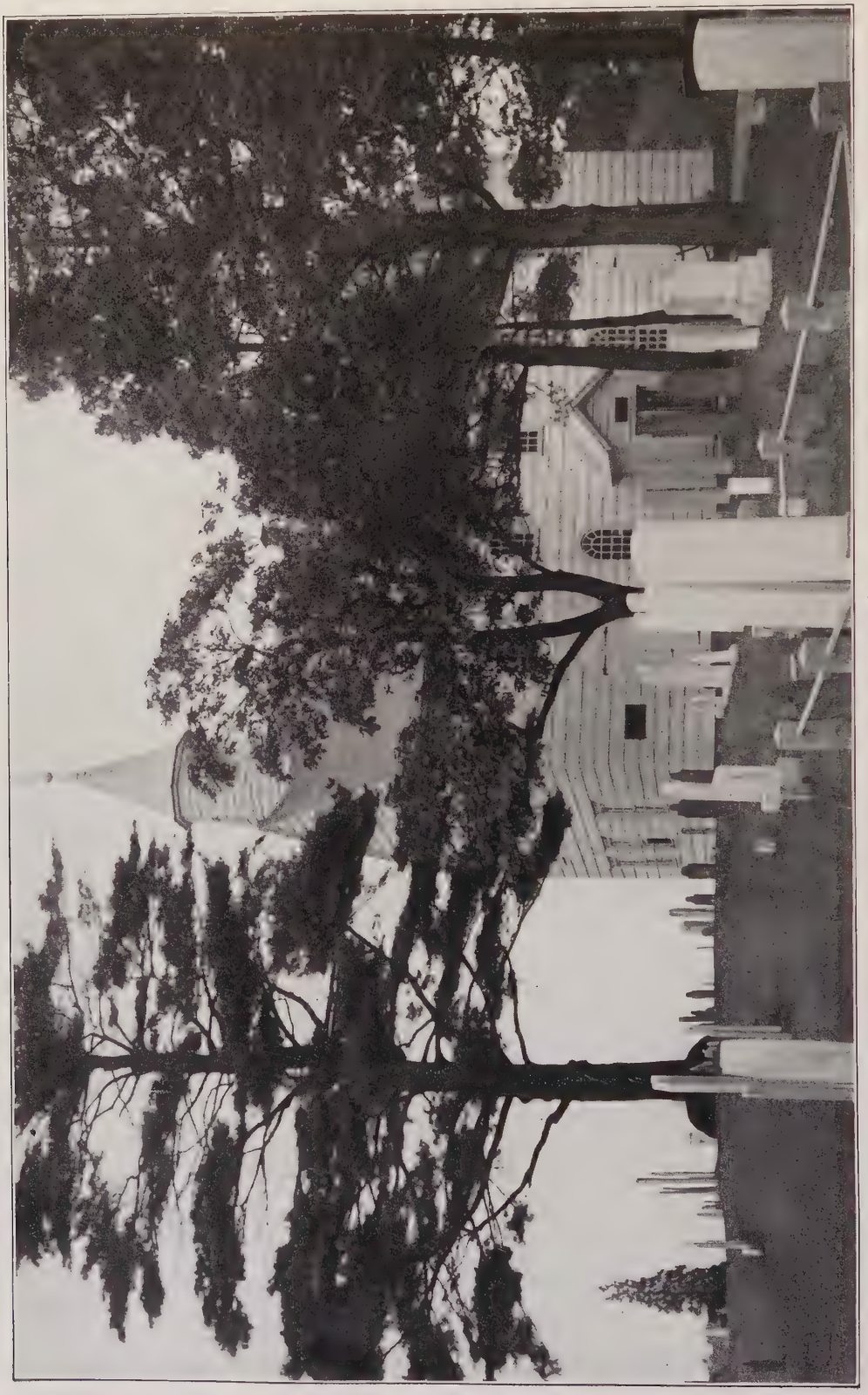
1812 was the realization of the need of good roads and rapid transit across the State, particularly across "the waist"—the section between the head of the tidewater of the Raritan and that of the Delaware, from New Brunswick to Trenton. A national charter was granted in the United States Congress for the building of a railroad over this space. The plan never materialized, but the circumstance is interesting as it was the first railroad charter to be granted in the United States.

New Jersey had benefited by the war in that not less than $2,000,000 had been circulated in the State as payment for transportation of goods, while investors were attracted by the abundance of water power and mill sites. The tariff of 1816 was also an encouraging turn for the State. But just as the State's industrial skies were brightening, England's large army was returning after long years of European war. This meant well-filled weeks of labor, low wages, and cheap production of manufactured goods in England. English capitalists hastened to send shiploads of surplus goods to America, and New York City was filled with auction rooms, to which buyers from New Jersey and the surrounding country flocked to purchase what they neither wanted nor needed. American manufacturers, seeing ruin ahead, petitioned Congress and State Legislatures, but in 1817 the panic came, and the suffering among the poor in New Jersey towns was great. The situation was an evidence that this State, like others, was changing from a farming commonwealth to an industrial one. And it was with dread and apprehension that the passing generation watched the mills and factories rise.

When Thomas Jefferson became President, the majority sentiment of New Jersey was Republican, and was proud to have a native son, Aaron Burr, in the Vice-President's chair, though this did not lessen the shock caused by the famous duel at Weehawken between Burr and Hamilton. The State mourned Hamilton as a friend of Washington and Governor Livings-

FRIENDS BURIAL GROUND AT SALEM, ESTABLISHED 1676

This oak tree, a survivor of the original forest, was standing here when John Fenwick founded Salem in 1675. It is 88 feet high and its foliage covers ¼ acre.



OLD TENNENT CHURCH AT ENGLISHTOWN
Used as a hospital during Battle of Monmouth Court House. Where Molly Pitcher won her fame.

ton and as an active supporter of New Jersey's manufacturing development. For 20 years New Jersey's annually elected governors, Joseph Bloomfield, William S. Pennington, and Isaac H. Williamson, were Republicans, with only one Federalist governor, Aaron Ogden, in 1812.

The years between 1800 and 1828 in New Jersey are called the "Turnpike Era." With the produce from the large farms of the State, the livestock and mines in the northern interior, and the products of the hundreds of mill sites of the State, markets had to be reached, and New York and Philadelphia had to be connected as well as the smaller communities. Good roads were necessary. During this time 54 original charters were secured for turnpike companies in New Jersey, and about 550 miles of gravel and dirt were laid.

Taverns were numerous, though their comforts and those of the stage coaches were meager. In the spring even the pikes were hub-deep in mud. But the resulting contacts and associations were beyond estimation. By 1834 the Delaware and Raritan Canal was completed between Trenton and New Brunswick, and shortly afterwards the Morris Canal farther north. Early in September, 1833, the State's first railway, the Camden and Amboy, was put into operation—after years of struggle with stage-coach interests. Within a very few years several other railroads were chartered and built. By this time the steamboat, too, had become an established fact.

When Andrew Jackson became President in 1828, New Jersey was firmly supporting him. Among her Jacksonian Democratic governors the name of Peter D. Vroom stands out. Until the panic of 1837 the New Jersey delegation to the House of Representatives was solidly Democratic. These years are often called the "era of social unrest." Reform was in the air and expressed by public meetings, lyceums, newspapers, legislatures, and thousands of pamphlets and monographs. Prison reform led to the abandonment of the old prison at Trenton and the erection of a better structure. Child labor was limited by the Legislature in 1851. An orphan asylum was incorporated at Mount Lucas near Princeton in 1845. The first insane asylum was opened in 1848 near Trenton.

Temperance societies flourished, particularly in West Jersey. Twenty years of prosperity followed the panic of 1817 and were marked by considerable economic development in the State. The factories were not large, but were growing and multiplying. Villages and towns were taking minor city ways upon themselves. The first flood of immigration had come. The immigrants coming to New Jersey were few, chiefly English, Scotch, and Irish, with a few Germans, all of whom were easily assimilated. The silkworm craze developed and burst in South Jersey.

With a feeling of false security, because of vast sums from the sale of public lands and the National Government's surplus revenue "loan" to "pet" banks in the State, bank notes were recklessly issued. The crisis came with the movement of hard money from the Eastern cities toward the West in payment for western lands. The returning paper brought the panic of 1837. New Jersey suffered with the other States, and knew well the tales of starvation on the streets of Philadelphia and New York. Not until 1844 was a normal economic condition established, and then we find that the glass industry in the southern portion of the State had survived the shock in many factories.

In North Jersey were numerous iron forges and factories. The cotton industry was especially strong in northeast Jersey and woolen in the south. Paper mills, potteries, and hat and clothing factories were scattered throughout the State. Shipbuilding towns thrived on the rivers. Henceforth New Jersey was to take her place among the great manufacturing States of the Union. The most potent expression of the reform spirit of the first half of the Nineteenth Century in New Jersey was the adoption of a new State Constitution in 1844, replacing that of 1776.

When the Mexican trouble arose in the 40's, New Jersey was heartily in favor of the war and was generous in raising the companies called for by President Polk. To the two brave Jerseymen, General Stephen Watts Kearny and Commander Robert Field Stockton, belong the honor of having seized San Diego and Los Angeles in 1847, thus annexing the Pacific slope.

From 1829 to 1837 the Democratic party triumphed. With the panic of 1837, this party was driven from power, and William Pennington, Whig, was governor until 1843. However, the Democrats were coming into power here and there in the State, until in 1850 the entire political machinery of the State was thrown into the hands of the Democratic party. By 1854 the old Whig party had died, and a new one had been born out in the new State of Wisconsin and had swept east under an old name, Republican. In 1857 Dr. William A. Newell became the first Republican governor of the State.

From the first settlement of New Jersey, negro slavery had been taken for granted as an economic matter. The moral question was not considered at first. In 1737 there were 4000 slaves in the province, eight and four-tenths per cent of the total population. In 1790 there were 11,000 slaves in New Jersey, a larger slave population than in any other State north of the Mason and Dixon Line except New York. A great deal of legislation was enacted concerning slavery, and during the last quarter of the Eighteenth Century we find considerable agitation against the institution itself. This had started among the Society of Friends much earlier. By 1860, slavery being illegal in the North, the census showed 64 slaves in the North and 18 of them in New Jersey, while in the South there were 4,000,000 negro slaves to 3,000,000 free whites.

After the passage of the national "Fugitive Slave Law" in September, 1850, New Jersey assumed an important part in the development of the "underground railroad" for aiding escaping slaves on their way to Canada. Into West Jersey particularly did the escaping negro come from the South, especially from Maryland and northern Virginia. It is claimed that there were as many as 12 definite routes across the State, and practically all began in the farmhouses of the West Jersey Quakers.

When the important year of 1860 arrived, along with the confused state of thought in the country, New Jersey's electoral votes were divided for the first time, giving four for Lincoln and Hamlin and three for Douglas and

BATTLEGROUND AT MONMOUTH COURT HOUSE, FREEHOLD, JUNE 28, 1778

Johnson. When Lincoln's call for troops came in April, 1861, giving New Jersey's quota as 3,000, there were 10,000 volunteers. Her loyalty was firm in spite of her closeness to Maryland and the South, and notwithstanding her support of a Democratic governor, Joel B. Parker, throughout the Civil War. During the four years' struggle the State furnished 79,348 men for periods from 100 days to four years and gave of money to the amount of $23,000,000.

With the end of the war came an intense industrial activity in the State. Between 1866 and the fateful "Black Friday" of 1873, New Jersey was almost revolutionized. Cities grew; population poured in from New York and Philadelphia; the great captains of industry forged to the front, and men strove not for the ideals of the period of unrest in Jackson's time, but for the material ideals that come with sudden wealth.

Money being plentiful, it was a time of speculation. Many schemes were floated, good and bad. Eleven companies were formed for working marl pits in the State and 32 for developing cranberry growing. Railroads closely connected the towns of the State. The commuters and land-promotion companies arrived. Cities built block pavement out into districts that would not need them for 50 years. The overspeculation in Western lands was reflected in New Jersey. Mortgages fell due as did taxes. In September, 1873, the crash came, and in this State, railroads, manufactures, and scores of industries were alike crippled. But by 1876 most had emerged from bankruptcy to see the world in a new light in the Centennial Exposition in Philadelphia.

When in 1898 President McKinley called for volunteers for conducting war against the Kingdom of Spain, New Jersey's quota was filled very rapidly. Part of her volunteers were assigned to the monitor "Montauk," which remained at Portland, Maine, during the war. Others were assigned to the "Resolute" and the "Badger" and were in active service in the fleet off Santiago.

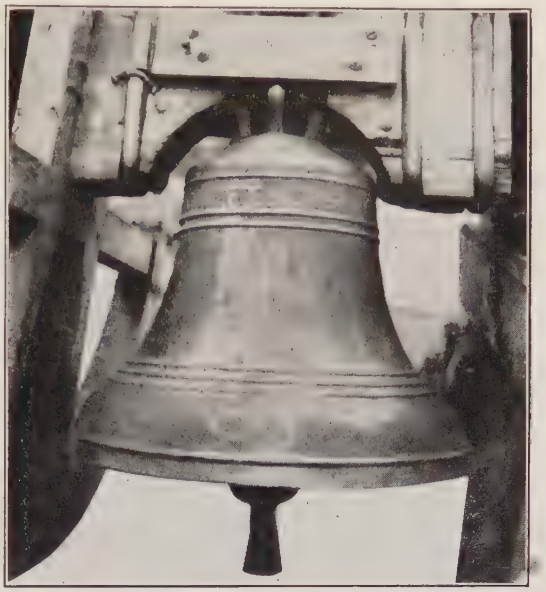
The close of the Nineteenth Century found New Jersey an important State in many ways. Eighty per cent of her population was urban, living in large cities or in daily contact with

MONUMENT AT CHESTNUT NECK ON THE ROAD FROM TOMS RIVER TO ABSECON
Commemorates battle fought here October 6, 1778

TRENTON MONUMENT
Commemorates battle fought on the site December 26, 1776

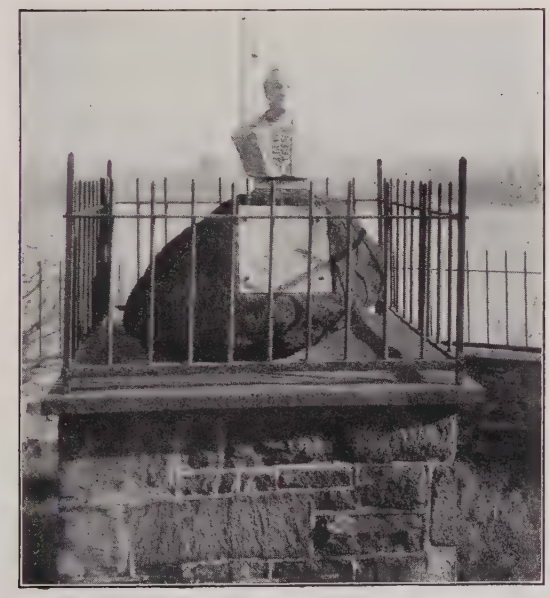
Philadelphia and New York. Her farms were still prospering, and her market-garden supplies for the large cities within and just outside her boundaries gave her then the name of the "Garden State." The two great factors which had brought about the change from a rural to an urban State in a hundred years were the development of manufactures and the growth of systems of transportation. The many silk mills in and around Paterson, brick and terra-cotta works around Perth Amboy, potteries at Trenton, jewelry manufacturing in Newark, woolen manufactures in Passaic, as well as the many plants throughout the territory devoted to leather, rubber, chemicals, iron and steel, shoes, hats, and glass, were only a few of the varied industries in the State in 1900. And they have only multiplied during the last 25 years.

The chief issues in State politics since the beginning of the century have been connected with taxation, the tariff, and the control of corporations. With the political interests of the State wavering from Democratic to Republican and back again, ever since the Civil War, the governorship of Woodrow Wilson, Democrat and former President of Princeton University, was of interest to the whole country. And this interest was intensified when he became the first President of the United States from New Jersey.



NEW JERSEY LIBERTY BELL IN THE TOWER OF THE OLD COURT HOUSE AT COHANSEY BRIDGE (NOW BRIDGETON), ERECTED, 1752

Rang out the news of the Declaration of Independence, July 4, 1776. Transferred to Fireman's Hall when the Court House was razed in 1846. Thereafter used as a fire alarm bell until 1854, when it was placed in the cupola of the West Jersey Academy. Still well preserved and now located on the Bridgeton High School.



SITE OF HAMILTON-BURR DUEL AT WEEHAWKEN

In the World War, New Jersey acquitted herself well. With her full quota of men overseas and in training camps, her industrial centers were beehives of activity, manufacturing war supplies as well as the necessities of life at home. Since the war much of the machinery for war equipment has been scrapped, but the factories and farms over the State are quite as busy in peace productions. The so-called metropolitan areas of the State near New York and Philadelphia are growing yearly. New Jersey stands thus at the center of the industrial belt of the United States where the currents of the day are swiftest.

HISTORIC SHRINES AND INTERESTING PLACES

Stories inspiring to Americans the nation over are immortalized in the historic shrines of New Jersey. How George Washington turned a long and disheartening retreat into a glorious victory at Trenton; the crisis that was successfully met at Monmouth; the deeds of intrepid souls who, risking the fate of traitors in a rebellion, carried on the civil affairs of a nation in the making; the trials and hardships of the Continental Army in Morristown; and the happy moments spent by the Commander-in-Chief at Rocky Hill—such scenes are recalled with a new sense of vividness when one treads the very ground on which they were enacted. Before the revered memorials and remains we pause a moment, read their meaning, and see in them and through them the birth and development of those American ideas, ideals, and institutions that we treasure.

The preliminary events of that memorable December 26, 1776, can be visualized at the Washington Crossing Park, nine miles above Trenton on the river road. Visit it in the summertime if you will and enjoy the natural beauty of the countryside and the refreshing breeze from the river valley, but if you would catch a glimpse of the loyalty, courage, and endurance of the men who made that spot famous, visit it on a cold and stormy winter morning, when the wind is from the northeast and beats sharp sleet in your face. Take refuge in the cozy little McKonkey House, the same that offered shelter to George Washington about 150 years ago. Here you may wander from room to room and enjoy the surroundings of a middle-class Colonial dwelling of Revolutionary times. The low-beamed ceilings, the huge fireplace, the old wooded lock and hinges on the doors of the kitchen cupboard—all have been reverently preserved.

Now face the cold again, follow the general direction of the line of march and proceed almost due east for about a mile in the direction of Pennington until you come to the first crossroads. On the northeast corner is Bear Tavern, little changed since serving as the first objective of the American Army after it crossed the river. Here it was, in all probability, that the Continental forces divided, General Sullivan and his group turning directly south, and General Green's division taking a more easterly route; the one entering Trenton by what is now Hanover Street, the other by the present Pennington Avenue. The story of the surprised and alarmed Hessian troops, the clash that ensued, and the victory that gave new hope to the cause of liberty is familiar to every schoolboy.

In Trenton there are many reminders of that fateful morning; of actual remains, however, there are but few. The Old Barracks located at the corner of South Willow and Front Streets pre-dates Revolutionary days, but is closely associated with them. The original sections were erected in 1758 by petition of the people to house the King's troops. The French and Indian War was in progress, and the populace lived in constant dread of attacks by the Indians. In that year, therefore, barracks were built in various parts of the State in order that troops might be distributed throughout the territory and yet not be quartered in the homes of the colonists. Today the remains at Trenton are all that are extant. For two weeks prior to the battle of Trenton a party of English dragoons and some German yagers occupied the building, together with a large number of Tory refugees who had placed themselves under the protection of the English Army. A week after the battle the building was filled with American militia. A visit to the Old Barracks is well worth the while. Different rooms have been furnished with rare collections of Colonial furniture by various historical societies, while a section of the former officers' quarters has been converted into a museum of relics and data of the Revolutionary period.

In addition to the Old Barracks, the Douglass House, now located at Stacy Park, is well worthy of the title of a historic shrine. A famous conference between General Wash-

JOHN BRAINERD SCHOOL, MT. HOLLY—Now a music school

HERE LIVED WALT WHITMAN AT CAMDEN, 1873–1892

INDIAN KING TAVERN, HADDONFIELD—Where Legislature met in 1777

JAMES FENIMORE COOPER'S HOMESTEAD—Cooperstown near Beverly

ington and his staff was held here on the night of January 2, 1777. The American forces, it will be remembered, were at that moment facing a crisis. They were encamped south of the Assunpink Creek; the second battle of Trenton had taken place; a superior British force faced them, and the impassable Delaware at their rear made escape to Pennsylvania impossible. Defeat that would have brought to naught the glorious achievements of the previous fortnight was imminent. Within the walls of this quaint old house, however, the perplexing problem was solved. It is said that while the council was engaged in its deliberations, a lady, possibly the wife of Captain Douglass, passed through the room, observing as she went, "Gentlemen, that which you are talking about will succeed." It did. The morning sun found the American Army in Princeton and the day witnessed a new victory for the cause of liberty.

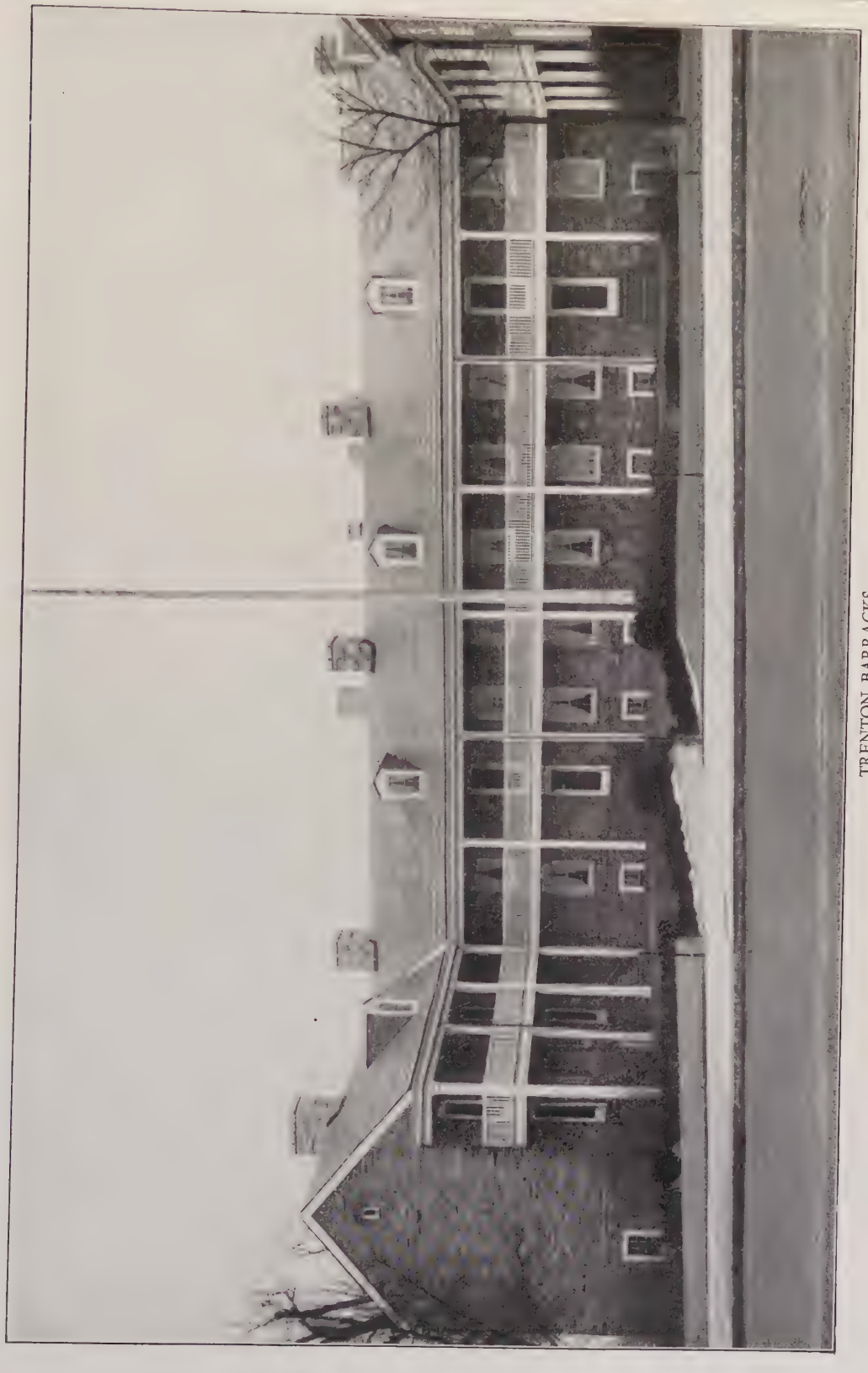
A pilgrimage to the Princeton battle-field site will be found full of interest. Golf links, the Graduate College of Princeton University, an immaculately kept country estate, and thrifty looking farmland now cover the territory. Despite this modern outlook, however, with a little persistence old landmarks can be found. After entering Princeton Township on the main highway from Trenton, watch for the bridge over Stony Brook. Turn sharp to the right after crossing it and follow the old Quaker Road along the brook for about a half mile. This will bring you close to a little Quaker meeting house, approachable only through a narrow country lane. This building housed the British Light Dragoons during December, 1776, and was in the thick of the struggle that opened the battle of Princeton. Follow the lane a few rods farther and you will come to the house in which General Mercer died. Just in front of it is a monument marking the spot where he was mortally wounded. Various markers point out the movements of the contending armies. On the Pyne estate near Mercer Street close by is the memorial to the British and American soldiers. Here the visitor will pause a moment in silent appreciation of the beauty of the spot and of the sentiments there inscribed in the verse composed by Alfred Noyes:

> Here Freedom stood, by slaughtered friend and foe,
> And, ere the wrath paled or the sunset died,
> Looked through the ages; then, with eyes aglow,
> Laid them to wait that future side by side.

Military operations frequently obscure the less spectacular but equally significant civil affairs, and admiration for national heroes too often dims the contributions of others less exalted but no less heroic. At various times during 1777 the first Assembly of the State of New Jersey, driven from Trenton and Princeton by the movements of the armies, held sessions in Haddonfield in the Indian King Tavern. The famous hostelry is on the old King's Highway in the center of this historic town. By an act of the Assembly therein enacted on March 15, 1777, the Council of Safety of New Jersey was created—a body of judicial, executive, and military authority of extraordinary scope. Under the wise leadership of William Livingstone it guided the affairs of the State wisely and well when the destiny of a nation hung in the balance and when all eyes were turned on New Jersey soil to witness the outcome.

In September of the same year the Legislature there unanimously resolved that thereafter the word "state" should be substituted for "colony" in all public writs and commissions. Recognizing the interest and importance of the events that happened within the walls of the old tavern the State Legislature in 1902 created a commission to purchase and care for the building. It is now open to the public, and there one may go and do reverence to the men who, if the armies had been less successful, could hardly have escaped the hangman's noose.

In a final analysis the fate of all the colonists hung upon military defeat or victory. It is little wonder, therefore, that the nation does particular honor to the man who guided the fighting forces, and sets apart the very ground on which he trod as a memorial to his genius, loyalty, and determination. On the Green Brook road from Dunellen to North Plainfield hundreds of automobilists pass daily. How few notice the American flag floating proudly from



TRENTON BARRACKS

Original sections built in 1758 to house troops during French and Indian War. Now under the management of the Old Barracks Association

the hilltop to the north as the southern extremity of North Plainfield is reached! It marks Washington Rock, now a State park, and a spot of unusual beauty. As the rugged slope is mounted an uncommon panorama is spread out before the spectator. From the skyline of New York City on the left the eye may wander for an expanse of 60 miles to the heights of Princeton and Trenton on the right. Here it was in the summer of 1777, when the American Army was stationed at various points on the plain below, that Washington resorted to witness the operations of the contending forces. According to no less an authority than John Fiske, the campaign in progress at that time has attracted far less attention than it deserves and in point of military skill was perhaps as remarkable as anything that Washington ever accomplished. A visit to this historic shrine will well repay the effort. If encouragement is needed, the State lodge at the summit may be mentioned where one may refresh oneself while reviewing this neglected bit of American history and enjoying the simplicity of the furnishings which are typical of the simple life of the Colonial farmer.

In point of advantage, operations on the military chessboard frequently shift from one extreme to the other with bewildering rapidity. The traveler has seen the remains of the winter of 1776–1777, reminders of the fortitude and courage of the men whose efforts at that time regained for the American cause the morale and prestige that had sunk to such a low ebb during the retreat through New Jersey. Washington Rock has been visited, suggestive of a period of military strategy no less important. However, fate had decreed another dark and anxious period for the patriots. Philadelphia was captured by the superior naval forces of the British, September 26, 1777, and the horrors of the never-to-be-forgotten winter at Valley Forge followed. Then the tables turned a bit. The French alliance made necessary the evacuation of Philadelphia by the enemy. Washington, quick to take advantage of every opportunity, reversed the condition of 1776, and pursued the British across the State. The climax of this campaign was the battle of Monmouth. Thence the traveler will wish to go to see such remains of that famous encounter as still exist. In those days it was called Monmouth Court House.

Freehold, Monmouth County, is the objective. Two blocks to the rear of the court house and standing 94 feet high is the battle monument: "Commemorating the success of the American Army on the 28th of June, 1778." Particular attention is directed to this monument because of the five bronze reliefs at its base which so graphically set forth the outstanding events of that conflict. The council of war at Hopewell is shown with Washington listening to Lafayette, who is urging an immediate attack, other generals being grouped around the conference table intent upon the argument. Washington is seen rallying the troops after Lee's ignoble retreat. "Molly Pitcher" is shown in the act of swabbing a gun, her wounded husband at her feet and the old Tennent Church in the background, while Ramsey defending his guns and Wayne's charge are depicted in the other two reliefs in minute detail.

With these illustrations lending a sense of reality to the historic remains that have been preserved, the traveler is prepared to visit the battlefield. Proceeding up Court Street, a left-hand turn will lead into the main highway to Englishtown. Keep a sharp lookout on the left along the railroad track and you will see a marker, "Molly Pitcher's Well," with the form of a closed well beside it. Differences of opinion exist as to whether this heroic woman obtained water from a well, a spring, or a brook, and some misunderstandings have arisen over the name. Certain it is, however, that a woman whose identity has been established beyond a reasonable doubt brought relief to the thirsty soldiers during the heat of the conflict, and after her husband was incapacitated by a wound, manned the gun that he was operating and kept that piece in action until darkness brought an end to the conflict.

A few rods beyond, on the opposite side of the road, the spot is marked where Washington met Lee and uttered the famous few but heated words, and where the panic-stricken troops were rallied and returned to the attack. As

BARNEGAT LIGHTHOUSE
Now a State Museum. One of America's most famous lighthouses. Built, 1858

Englishtown is approached the Old Tennent Church may be seen at the right and some distance from the road. You will feel the serene dignity of this old edifice as you stand beside it there on the hilltop overlooking the battlefield. You will think of the many sermons therein preached in the cause of loyalty and liberty, and you will recall how the peaceful quietude of a Sunday morning was suddenly interrupted by the sound of cannon and the pews deserted for the more imminent duty of caring for the wounded brought in from the heat of battle.

The fact that the reader has arrived at this point in a survey of the historic shrines of the State is fair indication that he will not become discouraged at the mere mention of the Washington Headquarters of New Jersey. Three old homesteads in particular—each sacred with peculiar historical associations, furnished with interesting and valuable relics and documents, and open to all who are interested—will well repay a prolonged inspection. A few months after the Battle of Monmouth, General Washington established his headquarters at the Wallace house in Somerville. This was in the winter of 1778–1779. It is in the west end of the town near the spot where the Raritan road crosses the tracks of the Central Railroad. One of the most interesting and significant events associated with his stay in Somerville had to do with the planning of the "Indian Campaign of 1779" which broke the power of the Six Nations along the New York and Pennsylvania frontier.

In point of time, the mansion of Col. Jacob Ford, Jr., in Morristown—the most famous Washington Headquarters in the State, if not the entire nation—should be mentioned next. It is situated on the road to Whippany, about a mile eastward of the village green, and was occupied by the General and his staff during their second winter in Morristown. For a period of sheer distress the winter of 1779–1780 associated with this old homestead can be surpassed only by the pitiable conditions faced at Valley Forge. Finally the Berrien Mansion at Rocky Hill will be included in the itinerary of the traveler. When Washington took up his residence here the war was practically over. Naturally enough, therefore, the place is replete with associations of many festive occasions. During his leisure moments at Rocky Hill the General wrote his farewell address to the army, a document characteristic in its simplicity and sincerity of the noble personage who served so well and suffered so much.

Put away, now, all thoughts of battlefields, the clash of arms, and political strife. Seek out a little house in Camden located at 330 Mickle Street, enter its hospitable doors, for all who come are welcome, and do reverence to the "good grey poet," Walt Whitman. Here he lived from 1873 to 1892; here he worked, and here he died. His grave is in Harleigh Cemetery. Here you will catch the spirit of appreciating the beauty in the commonplace, the good in all things, and the wholesomeness of American life, the very foundations of which you have traced in the historic shrines of New Jersey.

Of the very earliest scenes of New Jersey's history, when the red man looked out from his bark or skin home in the untouched forest and saw upon the tumbling waves of the sea the first of that new race that was to pour upon his land in millions, no trace remains. No marker indicates the spot, and the tradition itself is hazy, but Verrazano is said to have landed at the Navesink in 1524. Hendrik Hudson was at Sandy Hook in 1609. After returning from his trip up the Hudson in vain search for a northwest passage he anchored off Castle Point. Hudson thought that a white pinnacle of rock might be silver ore, but did not land to test it out. The Indians called the place We-awken, which meant rocks that look like trees, the first name for the Palisades.

Early spots identifiable in some measure today are the site in 1633 of a trading post at Paulus Hook in Jersey City and the place where in 1674 an iron works was started in Shrewsbury in which 60 negroes were employed in smelting the ore. Munitions for Washington's army were made here a hundred years later.

At Salem was the location of the Swedish fort which might have changed Jersey history had its garrison not been routed by an almost unseen enemy. The Dutch ships sailing up the

bay were compelled to salute and dip their colors as they passed. All went well during the winter and the colony seemed to be firmly settled, but during the summer the mosquitoes routed the garrison. The work was completed by Peter Stuyvesant, and the Swedes gave up and merged their interests with the Dutch and other colonists. The Swedes had bought from the Indians the lands along both shores of Delaware Bay and along the west side of the river as far as a point opposite Trenton.

One may now in a motor trip swiftly cover the route that took Benjamin Franklin several laborious days to make when in 1723 he walked across the State in search of work in Philadelphia. Franklin was proud in later years to sign his name with the word "printer" following it. Franklin intended to work in a printing office in Philadelphia, and leaving New York he landed at Amboy and began his long journey on foot. He arrived at Burlington and rowed to Philadelphia, and on the sixth day from New York he reached the printer's shop. The Washington House in Bordentown was the inn where he spent one night.

There are hundreds of historic trees in New Jersey, and some of them were standing when the Indians hunted their food through the forests. In Washington Park, Newark, just south of the tablet that tells the story of the Academy burned in 1780 by the British raiders who crossed on the surface of the frozen Hudson on January 25th, there stands a sycamore tree that was witness to the events of the Revolutionary days of 1764.

In the years during which England passed the Stamp Act so burdensome to her colonies, there were two sycamores planted in Princeton and they now shade the old house occupied by one of the university staff.

The great oak at Basking Ridge is one of the best known of Jersey's ancient trees. In 1781 some raiding Tories tied their horses there.

To a buttonwood tree that still leans over the river bank at Burlington was moored the ship "Madrid," the first vessel to pass up the

BERRIEN MANSION, ROCKY HILL, NEAR PRINCETON
Where Washington wrote the farewell address to his army, delivered here on Sunday, November 2, 1783

OLD INDIAN FORT ON TITSWORTH ESTATE, NEAR SUSSEX
Built 212 years ago

HANCOCK HOUSE NEAR HANCOCK'S BRIDGE AT SALEM
Scene of a massacre of patriots in 1778

McKONKEY FERRY HOUSE, WASHINGTON CROSSING PARK

WHARF WHERE SLOOP *GREYHOUND* LANDED TEA DESTROYED AT GREENWICH

Delaware beyond the then vacant site of Philadelphia and from which embarked more settlers for the scanty colony.

Under a great oak that still towers above the Quaker burying ground at Salem was made the treaty of friendship between the Indians and John Fenwicke, who with his wife, three daughters, and a small band of followers had sailed up the Delaware and into the small creek in 1675. Five men scarcely can circle the tree touching finger tips, and its branches spread horizontally 117 feet and reach a height of 88 feet. It may have been growing there when Columbus sighted the land of the New World.

In Burlington is St. Mary's Episcopal Church, built in 1703, said to be the oldest church structure in the State.

In 1769 Christ Church was built in Shrewsbury and was used as a barracks during the Revolution.

The church in Shiloh has a tablet in front of it reading: "Marker at Shiloh. Memorial of Seventh Day Baptist Brick Meeting House, 1771–1850. Union Academy, 1849–1868." In Shiloh everybody works on Sunday, but on Saturday the stores and places of business are closed and no one works.

In front of the church at Springfield and facing the Revolutionary battlefield stands a statue to keep in mind the brave deed of the "fighting parson," Rev. James Caldwell. Early on the morning of June 6, 1780, on the hill south of the old Connecticut Farms Church, 60 militiamen armed with muskets checked for a while the British advance. Rev. James Caldwell with his family lived in the parsonage of this church. The British in retreat fired into the house, killing Mrs. Caldwell as she sat with a baby in her arms. The second attempt to attack Washington's army was made on June 23, 1780. The British met some resistance at Connecticut Farms, now part of Union. One division started by way of Milburn for Morristown. On reaching Springfield they met the Americans under General Greene. The defenders ran out of wadding for the guns, and Caldwell gathered up Bibles and hymnbooks from the church at Springfield, and tearing out the leaves passed them to the soldiers, crying, "Put Watts into them, boys." The British were defeated and retired.

A granite monument 14 feet high at Greenwich is "in honor of the patriots of Cumberland County, New Jersey, who on the eve of December 22, 1774, burned British tea near this site."

On a narrow strip of land above the river bank near Weehawken and beneath the Palisades was the place where early one morning in July, 1804, the duel was fought between Aaron Burr and Alexander Hamilton, fatal to the latter. Burr, the son of the President of Princeton, blamed Hamilton for his failure to become Governor of New York. A son of Alexander Hamilton was later shot in a duel over his father's governmental plans.

A monument in the El Mora section of Elizabeth at the corner of Galloping Hill Road and Colonial Road, a block from Westfield Avenue, bears this inscription: "Here the British turned into Galloping Hill Road from Elizabethtown to Connecticut Farms and Springfield at the time of the battles June 7 and 23, 1780." Washington afterwards said of the New Jersey Militia: "They flew to arms universally and acted with a spirit equal to anything I have seen during the war." A son of Gen. William Crane is said to have been bayoneted to death near this spot.

During the dreary and uncertain days while the army under Washington was encamped in Morristown a fort was built on the hill to the southwest. This was named "Fort Nonsense" because no apparent military need existed for it. But as it kept the men busy and as the work displaced the dissatisfaction, it may have been a very wise structure. The tablet says that it was "an earthwork built by the Continental Army in the winter of 1779–80."

There is a marker at the spot where Washington crossed the Delaware on December 25, 1776.

The monument at Princeton with its carved figures is one of New Jersey's finest works in memory of the Revolutionary battles fought on its soil.

At Menlo Park, where Edison carried out so many of his successful experiments, before he moved to West Orange, there stands a marker

WALLACE HOUSE, SOMERVILLE
Where Washington made his headquarters during the winter 1778–1779

by the side of the road commemorating his work in the large laboratory there.

At Allaire is what remains of the deserted village, deserted almost in a night by the men leaving their furnaces and starting for the western goldfields.

The claim is made that the first telegraph message to be transmitted over a wire was sent at the iron works at Speedwell, near Morristown, at which place Professor Morse and Mr. Alfred Vail, son of the proprietor of the works, were making experiments with the telegraph. The first public message was sent more than six years later from Washington to Baltimore. Over three miles of wire on the walls of a room was sent the message, "A patient waiter is no loser." The house still stands. The Speedwell Iron Works was on the Morris Plains road where it crossed the Whippany River.

Many of the old Dutch houses in Bergen and Hudson counties, built of the old brown stone, are in fine shape today and as remodeled look almost as new as when constructed in the first days of the State's history. The old mansions of the days of English rule also are picturesque spots, notably the house in Elizabethtown where Governor Carteret lived.

Government House still stands in Perth Amboy, with a wing added since the days when William Franklin was the last Royal Governor of East Jersey. In the study in 1775 occurred the last stormy meeting between father and son when Benjamin Franklin, 69 years old, rode south to join the Continental Congress. In June, 1776, the son was deposed.

The Bordentown school children in memory of the woman who created the American Red Cross raised the money to rebuild the schoolhouse there in which Clara Barton first taught.

Belgrave, the site of the childhood home of Gen. Philip Kearny, is on a high bluff overlooking the Passaic River. It was General Kearny, who fought in many battles of the Civil War, who said: "Give me Jerseymen; they never flinch."

The daughter of Jonathan Edwards of Stockbridge and Northampton, Mass., was married to Rev. Aaron Burr, of Newark, sec-

ond president of the College of New Jersey, now Princeton University. They moved to Princeton and occupied the new house of the President next to Nassau Hall. It looks much the same today.

The Hermitage at Hohokus stands as a reminder that here Aaron Burr, the younger, courted Theodosia Provost.

The first house built in Flemington has a tablet giving 1756 as the date and "Fleming Castle" as the name.

In Mount Holly, at 47 Mill Street, stands the house used as a tailoring shop by John Woolman, and a frame dwelling in which he lived for a while is at 99 Branch Street. Woolman was the first to raise his voice against negro slavery. In 1742 he rose in meeting to protest, and later on walked to Newport, then the center of the slave-ship traffic, to fight it. His "Journal" is included in the "Five-Foot Book-Shelf" of Dr. Eliot.

In the old stone and log house at Alpine Landing, now used as a police station by the Interstate Park force, Cornwallis spent a night while pursuing Washington's forces in their retreat across the State.

One settlement in New Jersey was started by a woman, Elizabeth Haddon, whose father, John Haddon, a Quaker blacksmith of Southwark, near London, had bought land here. In 1701, on her twenty-first birthday, she sailed for her home in the then wilderness. It was she who built the meeting house in Haddonfield, and its records in her hand still exist. The story of her courtship and marriage to John Estaugh, the Quaker preacher who had preceded her here, has been told in Longfellow's "Tales of a Wayside Inn." The house that they built in 1713 on a hill above Cooper's Creek was burned in 1842, but two yew trees brought from England and the boxwood hedge are to be seen, as well as the English bricks of the garden wall.

At Bordentown, in a house still standing at the southeast corner of Farnsworth Avenue and Park Street, lived Francis Hopkinson, patriot and signer of the Declaration of Independence. A few doors away lived Thomas Paine, great propagandist of the Revolution.

OLD NASSAU AT PRINCETON
Where Continental Congress met in 1783

The birthplace at Caldwell of Grover Cleveland, President of the United States, is kept open for visitors.

James Fenimore Cooper was born in Burlington, in an old house at 457 South High Street, now the home of the Burlington Historical Society. Next door was the house of Captain James Lawrence, who when the Chesapeake lost to the Shannon died crying repeatedly, "Don't give up the ship."

In the pronunciation of many place names of old West Jersey one experiences a historical thrill, knowing that each one commemorates a courageous pioneer or a dear home back in England—Buddtown, Beverley, Gibbsboro, Whip Lane, Paulsboro, Gloucester. In many an old house of West Jersey is preserved the memory of Benjamin Franklin, James Fenimore Cooper, and Captain James Lawrence in Burlington and John Woolman in Mount Holly.

How sweet the silent backward tracings!
The wanderings as in dreams—the meditation of old times resumed—their loves, joys, persons, voyages.

AN ANCIENT CRAG OF TRAP ROCK STANDING OUT FROM THE FRONT OF THE PALISADES

COVERED BRIDGE OVER SOUTH BRANCH OF RARITAN RIVER

Built 200 years ago without a nail. All joining parts are wooden dowels. This is in Somerset County, where Anna Case, noted opera singer, was born.

GOVERNMENTAL ORGANIZATION

The New Jersey Constitution is one of the few remaining pre-Civil War constitutions. Like so many societies with a long history, New Jersey has retained many institutions long after their original purposes have been accomplished. This was the case with her first Constitution, that of 1776, which was adopted as a temporary expedient looking forward to reconciliation with England, but which was nevertheless maintained for 68 years. Then finally, when the successive waves of Jacksonian democracy had done their work in other States, with a single gesture New Jersey established a new Constitution in 1844. Many of the Revolutionary devices were wiped away, and in place of the simple document of five or six pages of print, there was adopted one of thrice the length.

This document of 1844 breathes the spirit of the democracy of the day. After 70 years' experience as an independent State in the Union, many lessons had been learned. Five new principles were incorporated in this Constitution and hold their place in the government today. First there is the promulgation of a bill of rights and privileges. There had been no such idea in the minds of the men of 1776, but now they follow the trend and enumerate the natural rights with which we are all so familiar in the first ten amendments to the Federal Constitution—free religion, free speech and free press, freedom from search and arrest except upon warrant.

A second departure is in the thorough adoption of the doctrine of the separation of powers. "The powers of the government shall be divided into three distinct departments, the legislative, the executive, and the judicial." No longer was the Governor to be chosen by the legislative council and assembly, but by the people. In him the executive power was vested. Legislative power was concentrated in a Senate and General Assembly. The old equality of the counties in representation in each body was surrendered for the Federal principle of equality in the Senate and proportional representation in the lower House. Final judicial power was placed in a Court of Errors and Appeals. An independent Chancellor replaced the Governor as dispenser of equity; the Supreme Court dispenses common law.

The most obvious result and intention of the separation of powers was to render the departments independent of each other. But this was more nominal than real. The principle of checks and balances was introduced in considerable detail as a mitigation of this other principle. The Governor was the executive, popularly elected for a three-year term, and was indeed the only State officer chosen at large. The State Treasurer and Comptroller (as also Common Pleas Judges at first) were to be selected at joint meetings of the Senate and Assembly. The Attorney-General, Prosecutors of the Pleas, Secretary of State, and keeper of the State prison were appointed by the executive head, with the consent of the Senate. Although the Governor is commander-in-chief of the military and naval forces of the State, the active heads, such as the Adjutant-General, Quartermaster-General, and Major-Generals, whom he appoints, are removable only by court-martial; and most of the field and regimental officers are elected by their subordinates. Moreover, the control exercisable over local county and city law-enforcing officers is almost negligible.

Nor was the Legislature endowed with full law-making powers, as the first view indicates. Quite apart from the veto possessed by the Governor, which might be overridden by a simple majority, the Constitution is full of limitations. To check the Legislature, prohibitions have been inserted to prevent or regulate such things as divorce by statute, lotteries, loaning the credit of the State to individuals, creating debts or liabilities of the State beyond the maximum of $100,000, private or local bills respecting highways, internal affairs of towns and counties, the granting of franchises, and schools. All such matters may be dealt with only by general laws.

LOS ANGELES (LARGEST AMERICAN DIRIGIBLE) AND SUSPENSION BRIDGE (LARGEST IN THE WORLD) OVER THE DELAWARE RIVER
Two great governmental achievements. Bridge from Camden to Philadelphia built by New Jersey and Pennsylvania. New Jersey is the home state of the Los Angeles.

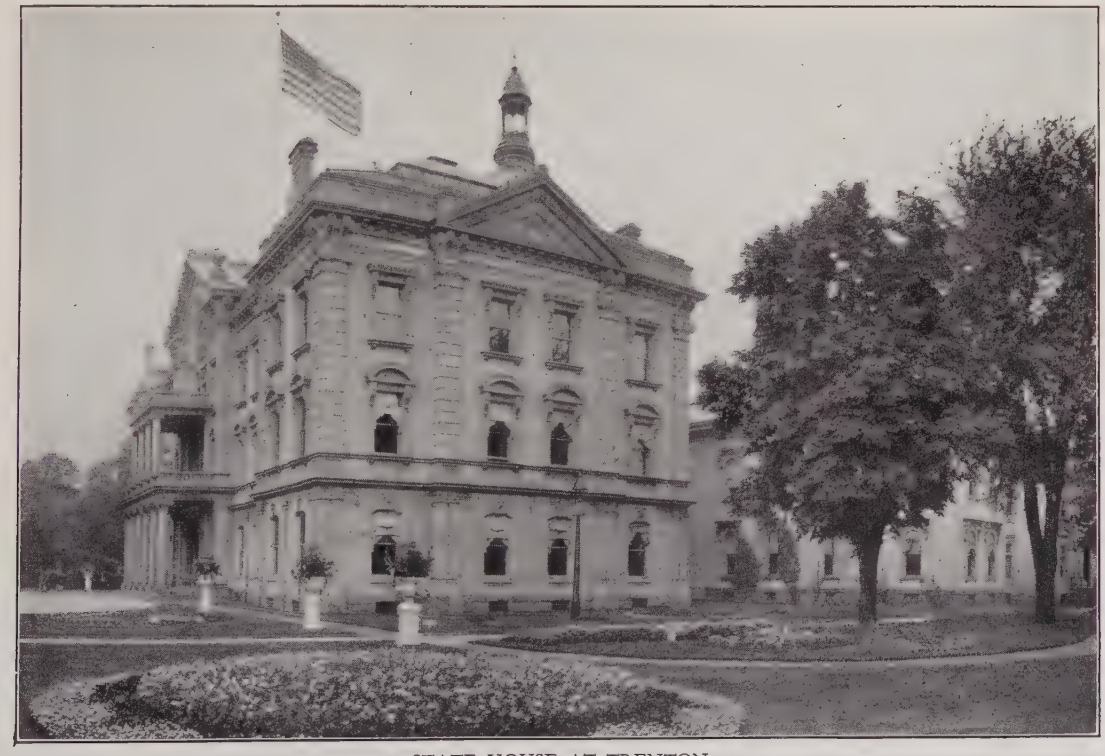
The courts were and have remained among the most independent and unchecked institutions in New Jersey. While the judges are not appointed for life, the reputation of the State for "Jersey justice" has been largely owing to the fact that no judge of a court of record is elected. The Justices of the Supreme Court, the Chancellor, those of the Common Pleas, though nominally appointed for some five, six, or seven years, are virtually secure in their tenure. Removal from office is by impeachment. The Governor has a right of reprieve, but for pardon he is only one of a court including the highest judges.

In one final respect the Constitution introduced an innovation. This was in providing a special method of constitutional change. Amendments must be passed by two successive Legislatures, and after adequate newspaper publicity in each county, are to be submitted to popular vote throughout the State. The referendum is used in one other case—the occasion being the Legislature's desire to increase the State indebtedness beyond the prescribed limit, in which event there must be popular ratification.

From this early organization there has been a great and supplementary growth. From the government of a simple agricultural and trading community the government of New Jersey involves institutions and purposes which vary from regulating maximum automobile speeds to the inspection of factories; from maintaining villages for epileptics to licensing civil engineers; and from supervising boxing contests to operating employment bureaus. The salaries paid vary all the way from $19,000 for Supreme Court Justices to $200 for pages in the Legislature.

The Governor is elected by the voters of the State for a term of three years, taking office on the third Tuesday in January. A governor is ineligible to succeed himself.

The original executive machinery is comparatively simple. Some four or five major officers are named in the Constitution; all the others are later additions by legislative action. And as the State has entered industrial and



STATE HOUSE AT TRENTON

The Governor's office is on the ground floor, middle wing. Senate Chamber is at the right rear of the picture

RAMAPO MOUNTAIN RANGE FROM STATE HIGHWAY NORTH OF OAKLAND

social regulation, different types of institutions have been created from time to time. There are now about 20 major and 30 minor State departments. These are run by boards, commissioners, and directors chosen in a great variety of ways for different terms and at different rates of pay. They vary in term of office from three to nine years, and in pay from nothing to $15,000 a year.

The two houses of the Legislature are the Senate and General Assembly. Each of the 21 counties is represented by one Senator chosen for three years, who must be 30 years of age, a citizen, and a resident of the State for four years and of the county for one. The Senate has but two distinctive functions, the trial of impeachment cases and the assent to nominations by the Governor. The Assembly is composed of 60 representatives elected annually, apportioned among the counties according to population, but no county to have less than one. As two counties have a population of over 650,000 and as eight have fewer than 50,000, this cannot be arranged in proper proportion. The Assembly has but one power not shared equally with the Senate, namely, the initiation of bills for raising revenue. In all other respects the houses are equal. The members choose their own presiding officers, decide disputed elections, and receive the same stipend of $500.

In the administration of justice New Jersey presents contrasts of efficiency and antiquity. The appointive judges have tended to maintain judicial independence. But there has also been retained the distinction between courts administering equity and courts administering common law. The Chancellor (with seven Vice-Chancellors, masters, surrogates, etc.) takes cognizance of cases in equity respecting divorce, wills and probate, orphans, etc. The other courts for common law extend from the justices of the peace and recorders, to district courts, county courts (Common Pleas), circuit courts, and finally the Supreme Court, composed of a Chief Justice and eight Associates. Final judicial authority is vested in a Court of Errors and Appeals, composed of the Chancellor, Supreme Court Justices, and five others.

At the present time the importance of the town has been largely superseded by the grow-

GREEN BROOK PARK IN PLAINFIELD, UNION COUNTY RESERVATION

ing metropolitan areas. Counties are used as judicial units, as agents for the care of the poor, for highways, for enforcement of laws by the sheriff, and for taxation and elections.

Some of the oldest cities in America are in New Jersey. For years the government of municipalities was of the mayor and council type. In 1911, however, the Walsh Act permitted the adoption of commission forms by certain communities. Cities are grouped into four classes, and within their groups they may by popular vote adopt the plan of having a board of from three to five commissioners who shall take over all the administrative, legislative, and judicial functions previously distributed among mayor, council and elected officials.

In 1923 a further step was taken when it was made possible for municipalities to adopt the city-manager plan. There are to be from three to seven members of a municipal council chosen at large, who select as presiding officer a mayor. But their chief function is to select, appoint, and retain a professional municipal manager, whose duties are to propose policies, investigate plans of administration, and finally to execute those that have received the approval of the council. Cape May City is the only place so far to adopt the city-manager plan now permitted by law.

From 1903 New Jersey had been experimenting with election laws. It was in 1911, however, that the great step of introducing the direct primary was taken. By the Geran Act important changes were made in political parties and in their nominations of candidates for election. The old delegate convention and the unregulated primary were abolished, and instead a system of State-controlled party nominations was introduced. It provided for the registration, voting, and counting of the vote for party candidates, and placed control of party committeemen in the hands of interested party adherents.

RARE BEAUTY AND WONDERFUL FISHING IN THE STOKES STATE FOREST

REVENUE AND TAXATION

Perhaps the most striking impression of a study of the fiscal history of New Jersey is the increase in revenues and expenditures, especially during the period since 1800, and most amazingly since 1900.

In 1668, £30 was raised and expended. In 1800, revenues were $9,927.92 and $23,575.33 was spent; in 1900, $3,453,295.71 was received and $2,701,226.97 spent; in 1927, $33,441,097.48 received and $30,454.820.13 disbursed.

The list of expenditures for the year 1704, in which the budget was £2000, will serve to indicate the narrow scope of State functions in that day. This amount was raised by means of a direct tax on specified articles of property and on certain occupations, and is as follows:

Governor	£ 650
Lieutenant-Governor	300
Receiver-General	260
Governor's house rent, etc.	180
Chief Justice	130
Second Judge	100
Attorney-General	100
Secretary	30
Clerk of Council	50
For contingencies	20
Clerk of Assembly	50
For contingencies	20
Printer	50
Doorkeeper for Council	30
Doorkeeper for Assembly	30
Total	£ 2000

The greatly increased budget of New Jersey, as in other States, is due in some degree to a centralizing tendency, and to that extent involves no new functions. It is also, in part, an actual bringing into the field of regulation much of the activities of individuals which were previously unregulated. To some extent the increasing complexity of a commercial-industrial society creates new relationships that require and demand regulation. The centralizing tendency is well illustrated in the fields of education, health, and highways. These matters in an earlier day were of purely local, or even individual, concern. The earliest local taxes, indeed, were for the maintenance of bridges and roads.

The rate of increase in local budgets has been even greater than in the State budget, and in recent years the amounts raised and spent locally for local purposes through the State have totaled about four times the amount raised and spent by the State government itself. In rough figures, there is about $221,000,000 spent a year for government within the State, of which the State government expends less than one-fifth.

The functions of the State government were still very narrow in 1800. The amounts paid out for salaries, for the State prison, for the Legislature, and for pensions, made up the bulk of the expenses. By the middle of the century the expenses were more than five times those of 1800, but this was due more to the increase in population than to any added functions of the government. The chief new items worthy of note were the expenditures for the blind, for the deaf and dumb, for a lunatic asylum and salaries of its managers, for inquisitions, for building a house of refuge, for a court of errors and appeals, for a library, and for establishing a school fund.

By 1860 a State Normal School had been established, and considerable amounts were being expended for the public schools; and by 1900 there had been established a number of boards and commissions of a regulative nature, such as the Board of Fish and Game Commissioners, the Oyster Commission, the State Board of Health, the Department of Banking and Insurance, the State Board of Assessors, the Riparian Commission, and the State Sewerage Commission. Judicial expenses, too, had increased very rapidly. The Supreme Court and the Court of Chancery were the main items of this nature. In 1900 the sum of $48,192.80 was spent for industrial education. Considerable sums were needed for the State Board of Education, for the Superintendent of Public Instruction, and for such things as free school libraries.

NEWARK CITY HALL AND ANNEX

PUBLIC BATH HOUSE—CITY OF NEWARK

ESSEX COUNTY COURT HOUSE, NEWARK—Annex in rear

BERGEN COUNTY COURT HOUSE AND JAIL—HACKENSACK

During this half of the century the State had entered an entirely new field—agriculture. In 1900 the largest item of expense under this head was that of the Agricultural Experiment Station. Other expenditures were for the State Dairy Commissioner, the Tuberculosis Commission, and the State Board of Agriculture. Large amounts were then being expended for military purposes and for public roads. But the greatest increase in functions and expenditures was in the field of charities and correction. In 1900, out of a total of $2,701,226.97 of expenditures from the State fund, the sum of $1,284,047.56 was for such undertakings. For the most part, the phenomenal increase in expenditures since 1900 has been due to a rapid expansion of those agencies already created.

The following statement of the expenditures for the fiscal year ended June 30, 1927, will give some idea as to the present scope of State activities:

Institutions and agencies	$ 9,610,651.75
General	5,386,975.42
Educational	4,410,590.93
Regulative	3,546,810.77
Executive and Administrative	2,190,340.86
Constructive	1,866,939.84
Military	1,000,938.55
Agricultural	999,044.87
Judicial	988,372.74
Pension and retirement funds	263,685.00
Legislative	140,469.00
State emergency fund	50,000.00
Total	$30,454,819.73

In addition to the expenditures shown in the schedule, representing the items disbursed from the "State fund," there is a large number of boards, commissions, and funds whose revenues are not passed through the State fund, but are derived independently from special taxation, invested funds originally appropriated from the State fund, or otherwise. For example, in 1927, there were the State road tax, amounting to $5,481,105.35; motor vehicle license fees and the gasoline tax, the soldiers' bonus bond tax, $948,017.80; and the bridges and tunnels tax, $1,945,533.10, as the principal revenue items not passed through the State fund, but which nevertheless were spent directly by the State government, through its administrative agencies.

The disbursements from the State fund in 1800 were $23,575.33, while the receipts were only $9,927.92. The next year, however, an act was passed for raising a tax of $30,000, and from then until 1847 similar acts were passed practically every year, the amounts varying from $10,000 to $60,000. During the period from 1800 to 1850 the disbursements rose from $23,575.33 to $125,541.93. Since the annual State tax during this period had never exceeded $60,000 (and that for only the one year 1814), it can readily be seen that some other source of revenue had been found. In 1810 an act for the taxing of bank stock was passed. This was New Jersey's first attempt to reach intangible wealth by taxation. The president and directors of specified banks were required to pay annually into the State treasury one-half of one per cent on paid-up capital stock. By an act passed December 26, 1826, provision was made for collecting the percentage tax of the gross amount of premiums received by agents of foreign insurance companies doing business within the State, and by the act of January 21, 1831, a tax was placed upon the capital stock of insurance companies incorporated within the State. This tax was one-fourth of one per cent.

The first acts regarding railroads and canals were passed in 1830. On February 4th of that year the Legislature passed acts incorporating the Delaware and Raritan Canal Company and the Camden and Amboy Railroad Company. It was provided that the officers of the companies should make quarterly returns of the passengers and freight transported and pay to the State Treasurer a lump sum per passenger and per ton. By an act passed February 22, 1849, the roads were required to make statements of the cost of the road and its earnings until the net income amounted to six per cent upon its cost, after which the road should pay to the State an annual tax of one-half of one per cent.

In 1840 the sum of $30,276.39 was collected from these transit duties. This had increased to $42,136.59 in 1845, and to $86,207.36 in 1850, when the total receipts to the State fund

were only $128,583.03. Most of the remainder, or approximately $42,000, was made up from the tax on the capital stock of railroads ($12,665) and from dividends ($21,000). Apparently these acts had been productive of enough revenue to meet the needs of a government whose functions were still comparatively narrow, for a State tax was no longer levied every year.

The act of March 14, 1851, was the first general property tax act in New Jersey. It rendered liable to taxation all property, real or personal, whether owned by individuals or corporations. Railroads were thus brought under the general property tax, but only until 1873. The general property tax still continues to be the basis of the New Jersey tax system, but railroads and corporations generally have been specially taxed.

By an act passed April 13, 1876, a board of railroad commissioners was created, consisting of the Comptroller, the Treasurer, and the Commissioner of Railroad Taxation. They were given the power to estimate the "true value" of the road and equipment as a basis for the State rate of one-half of one per cent. The method of taxing railroad and canal property was further developed by the act of 1884. The main features of this act have been retained to the present time.

By the act of 1884 the State Board of Assessors was created, composed of four members appointed by the Governor with the approval of the Senate.

On April 5, 1906, an act known as the Perkins Act was passed. This produced a very considerably increased revenue from the railroads, and this net increase was applied to the support of the public school system.

The act of 1884 and the supplements thereto have been so productive of revenue that the State has been able to dispense with any direct tax for general purposes. The amount of tax on railroad and canal corporations levied and collected for the year 1884, under the old law, was $713,655.46. The amounts collected for the last 28 years, under the law of 1884 and acts supplementary thereto, are as follows:

BEAUTY SPOT IN WEST HUDSON COUNTY PARK, HARRISON AND KEARNY

Payable in the Year	State Tax for State Uses	Local Tax	Total Tax
1900	$ 906,788.22	$ 610,091.86	$ 1,506,880.08
1901	895,477.32	608,460.00	1,503,937.32
1902	899,210.95	601,313.80	1,500,524.75
1903	908,546.32	626,494.39	1,535,014.71
1904	921,795.11	642,514.50	1,564,309.61
1905	939,767.46	655,355.68	1,595,121.14
1906	950,991.21	1,123,375.69	2,074,366.90
1907	3,502,868.24	892,505.40	4,395,373.64
1908	3,246,733.45	1,031,690.01	4,278,423.46
1909	3,390,441.93	1,259,264.20	4,649,706.13
1910	3,720,898.95	1,448,206.05	5,169,105.00
1911	3,924,575.74	1,396,814.01	5,321,389.75
1912	4,332,410.91	1,805,917.83	6,138,228.74
1913	4,503,591.50	1,964,276.92	6,467,868.42
1914	4,533,002.46	1,953,680.39	6,486,682.85
1915	4,650,150.89	2,088,487.65	6,738,638.54
1916	4,980,948.51	2,160,917.71	7,141,866.22
1917	5,266,501.17	2,196,917.95	7,463,419.12
1918	5,495,360.65	2,601,657.46	8,097,018.11
1919	5,939,891.83	2,084,285.30	8,024,177.13
1920	7,037,260.62	3,594,098.63	10,631,359.25
1921	7,135,071.32	3,651,805.72	10,786,877.04
1922	8,375,185.49	4,332,545.23	12,707,730.72
1923	9,135,731.30	5,134,499.91	14,270,231.21
1924	9,407,135.06	6,326,615.20	15,733,750.26
1925	9,409,734.65	7,398,728.75	16,908,463.40
1926	9,912,628.87	7,686,573.53	17,599,202.40
1927	9,592,225.04	8,720,358.34	18,312,583.38

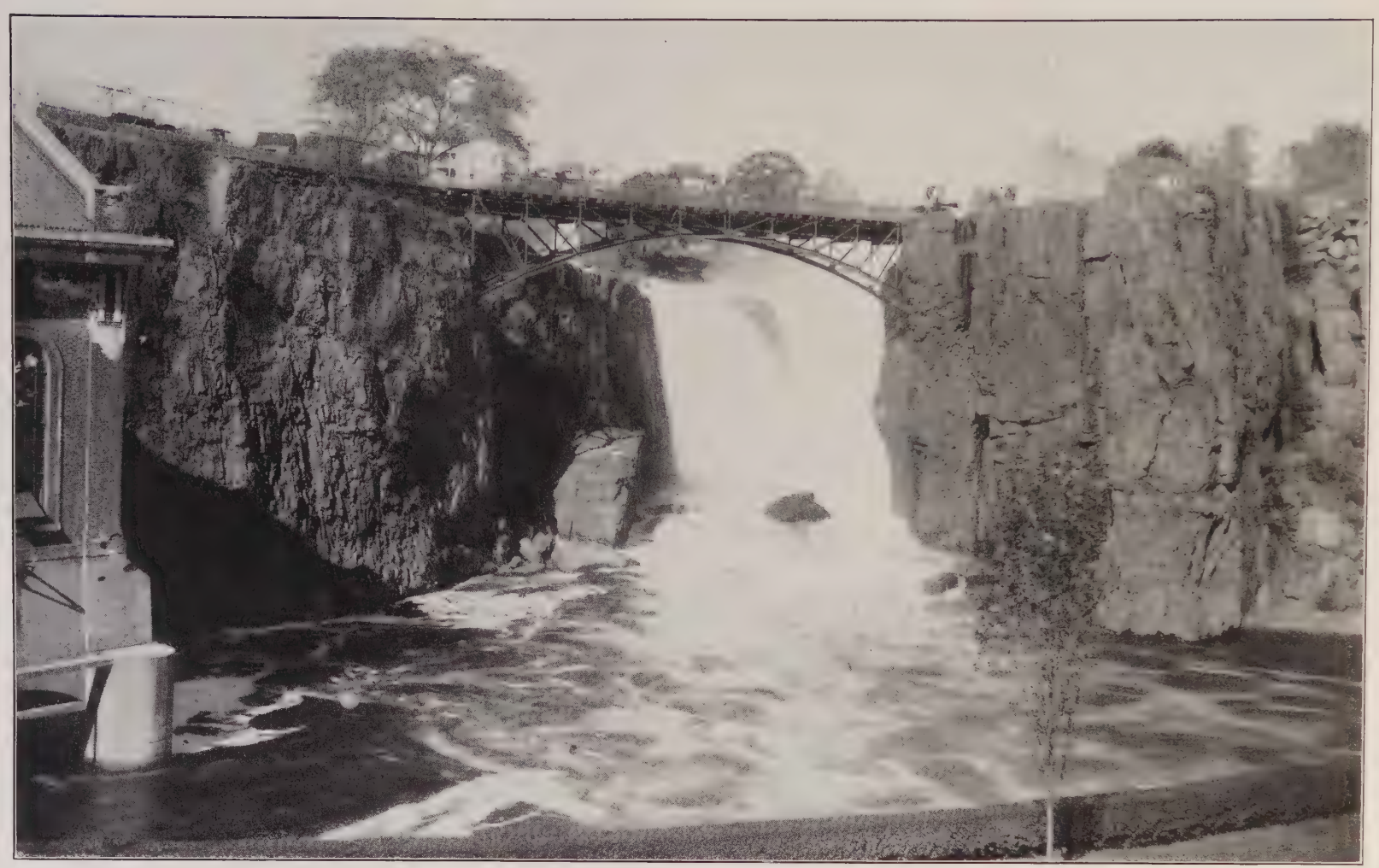
The figures for the last ten years were taken from the annual reports of the Comptroller for each of those years. They represent the total amount of tax collected in each year whether due in that year or in previous years. The amounts of State tax for the year 1907 and the years subsequent thereto include the apportionment for school purposes.

Another large source of revenue for general State purposes is the franchise tax levied on miscellaneous corporations. The first act was passed in 1884, and its main features have remained unchanged. Manufacturing, mining, agricultural, and horticultural companies with 50 per cent of their capital invested in New Jersey are exempt. It is a graded tax; one-tenth of one per cent on all amounts of capital stock issued and outstanding up to and including the sum of $3,000,000, and one-twentieth of one per cent on all sums in excess of $3,000,000 and not exceeding $5,000,000, and the further sum of $50 per annum per $1,000,000 or any part thereof on all amounts in excess of $5,000,000. In the case of stock with no par value the sum of three cents per share shall be paid upon all shares of stock issued and outstanding, up to and including 20,000 shares; two cents per share on all in excess of 20,000 and not exceeding 30,000 shares; one cent per share on all in excess of 30,000 shares but not exceeding 40,000 shares; five mills per share on all in excess of 40,000 but not exceeding 50,000 shares, and the further sum of two and one-half mills per share on all shares of such stock issued and outstanding in excess of 50,000 shares.

In 1892 the Legislature passed an act known as the Collateral Inheritance Tax Act, the official title of which is "An Act to Tax intestates' estates, gifts, legacies, and collateral inheritance in certain cases." Few States had passed such acts previous to that time, but Virginia had such a statute as early as 1844, and those of Maryland, Pennsylvania, and New York had been adopted before 1892.

The statute of 1892 imposed a tax of five dollars upon every $100 of value, of "all property which shall pass by will or by the intestate laws of New Jersey, of all estates that shall be valued at over $500, with the following exceptions: Those to or for the use of father, mother, husband, wife, children, brother or

JERSEY CITY APPROACH TO HOLLAND TUNNEL



PASSAIC RIVER FALLS IN PATERSON

One of the wonders of the Eastern States. The falls, 70 feet high, make a wide arc at the rear of the precipice on the right of the picture

sister, or lineal descendants, born in lawful wedlock, or the wife or widow of a son, or the husband of a daughter." The tax was turned over to the treasurer for State purposes.

Until 1914 New Jersey had taxed only collateral inheritances, but in that year the Legislature passed an act which provided for the taxing of direct inheritances as well. This act resulted in a greatly increased revenue. By an act passed in 1922, certain changes were made in the rates and exemptions, but something had to be done to keep pace with the natural increase in the cost of government, and in 1926 the rates were again revised upward. As before, property passing to or for the use of the State or a municipal corporation within the State for exclusively public purposes was exempt. Property passing to churches, hospitals, and orphan asylums, public libraries, Bible and tract societies, religious, benevolent and charitable institutions and organizations, was still to be taxed at five per cent. Property passing to a brother or sister of decedent, wife or widow of a son of a decedent, or the husband of a daughter of a decedent, or the issue of any child or legally adopted child of a decedent, was taxed five per cent in amounts up to $300,000, and increasing to 16 per cent for any amount in excess of $2,200,000.

Property passing to a father, mother, husband, wife, child or children of a decedent, or to any legally adopted child or children of a decedent, was exempt under $5,000, and from $5,000 up to $50,000 the tax was one per cent, and so on in increasing ratio up to 16 per cent for any amount in excess of $3,700,000.

Property passing to every other transferee, distributee, or beneficiary not in the foregoing classifications was taxed eight per cent for any amount up to $900,000, and so on up to 16 per cent for any amount in excess of $1,700,000.

Stock of New Jersey corporations and national banking associations standing in the name of or belonging to a non-resident decedent was no longer to be considered as a taxable asset in the estate of said decedent. The Comptroller in his report for 1927 claimed that there was but a slight decrease in the revenue from non-resident estates and this loss was more than offset by the increase in revenue derived from resident estates.

As has been noted, the State since the act of 1884 has been able to dispense with the general property tax. Since that time the receipts from railroad corporations, miscellaneous corporations, and the inheritance tax (since 1892) have amounted to approximately 75 per cent of the total receipts. The remainder is made up chiefly from such things as fees, fines, licenses, interest on deposits, and the sale of articles manufactured at the State prison, reformatory, institution for the blind, etc. Items amounting to more than $100,000 are as follows:

Department of Banking and Insurance	$2,000,000
Department of Institutions and Agencies	1,000,000
Secretary of State	600,000
Motor Vehicle Department	600,000
Interest on Deposits	450,000
Commission on Elimination of Toll Bridges	450,000
Board of Fish and Game Commissioners	319,330
Real Estate Commissioners	170,000
Clerk in Chancery	125,000
Clerk of the Supreme Court	115,000
Department of Commerce and Navigation	113,000

Marked as has been the increase in State expenditures, the increase in local expenditure has been even greater, and this despite the fact that much of the State fund account goes to assist in the doing of things which formerly were performed entirely without the participation of the State. In 1927 the total amount raised by taxation for local purposes and distributed by local disbursing officers was $187,581,154.59. This total includes the so-called State school tax of $13,205,163.94, which is not really what its name implies at all, but a local tax. It is levied and collected by the local taxing district like any other local tax, paid into the State treasury by the counties, 90 per cent immediately refunded to them, and the remaining 10 per cent, called the reserve fund, reapportioned among the counties by the State Board of Education in accordance with their respective needs.

In addition the school fund, having a principal of about $10,000,000 ($10,711,301.95 on June 30, 1927) invested in securities, riparian rights and real estate, yields an annual revenue of about $500,000, apportioned to the counties by the Commissioner of Education

Until about 1810 the taxes on specific property, the poll tax, and taxes on occupations or businesses were sufficient. Sometimes only one of these was used at a time, sometimes two, and sometimes all three. In 1851 the first general property tax law was passed in New Jersey, and this tax is still the basis of practically all local revenue, as well as of special State taxes, such as the road tax, institutional tax, soldiers' bonus bond tax, bridges and tunnels tax, school tax, and various others.

The general property tax assesses all property, real and personal, tangible and intangible, an assessed valuation, supposed to be its true market value, but usually somewhat lower. Local taxes and some State taxes are levied as a percentage of this valuation. This tax has not been wholly satisfactory in administration; taxation of intangibles has proved almost an impossibility, evasion is universal, and thus inequality results from the virtual exemption of those whose property is largely in securities and other intangibles.

STATE HIGHWAY ROAD AND BRIDGE CONSTRUCTION

Year	Revenue from Mill Tax	Revenue from Bond Issue	† Revenue from M.V. License	Revenue from Gas Tax	Revenue from Federal Aid	Total
1917.....	$ o	$ o	$ o	$ o	$ o	$ o
1918.....	2,895,206.66	o	o	o	118,425.36	3,013,632.02
1919.....	3,489,545.15	o	o	o	771,408.02	4,260,953.17
1920.....	3,340,325.89	o	o	o	1,128,696.51	4,469,022.40
1921.....	3,569,725.97	o	o	o	1,187,556.45	4,757,282.42
1922.....	3,840,339.03	o	o	o	942,870.95	4,783,209.98
1923.....	4,095,658.62	8,000,000.00	o	o	628,580.63	12,724,239.25
1924.....	3,483,777.40	8,000,000.00	1,750,000.00	o	580,313.16	13,814,090.56
1925.....	2,217,972.92	8,000,000.00	3,503,048.26	o	942,871.00	14,663,892.18
1926.....	3,886,043.64	8,000,000.00	3,882,130.50	o	894,958.00	16,663,132.14
1927.....	2,945,478.09	8,000,000.00	4,622,391.83	B 3,378,552.58	934,611.00	19,881,033.50
1928.....	* 2,000,000.00	A 30,000,000.00	5,735,000.00	* 8,200,000.00	935,122.00	46,870,122.00
* 1929.....	1,637,000.00	o	6,660,000.00	9,000,000.00	950,000.00	18,247,000.00
* 1930.....	1,520,000.00	o	7,385,000.00	9,800,000.00	950,000.00	19,655,000.00
* 1931.....	1,400,000.00	o	8,110,000.00	10,600,000.00	950,000.00	21,060,000.00
* 1932.....	1,280,000.00	o	8,660,000.00	11,400,000.00	950,000.00	22,290,000.00
* 1933.....	1,600,000.00	o	8,660,000.00	11,400,000.00	950,000.00	22,610,000.00
Total.....	$43,201,073.37	$70,000,000.00	$58,967,570.59	$63,778,552.58	$13,815,413.08	$250,762,609.62

A—Sale of Bonds authorized as required for construction.
B—Gas Tax Collections July 1st to Nov. 30, 1927.
*—Estimated.
°—Mill Tax becomes available year following its assessment and collection.
†—Portion of total receipts applicable to road and bridge construction.

NOTE: This table was specially compiled for this book by the State Highway Department.

REGIMENTAL REVIEW AT SEA GIRT

WHITE HOUSE. GOVERNOR'S HEADQUARTERS AT SEA GIRT

THE STATE CAMP GROUNDS

The Sea Girt site, known formerly as the Stockton Farm, was selected in 1885 by the military authorities of New Jersey for annual encampments, and, when necessary as in 1898, mobilization of the organizations of the national guard for muster into Federal service.

The State leased the camp grounds in 1885 from the Sea Girt Land and Improvement Company at an annual rental of $3000. but did not acquire the property by purchase until 1891. In 1907 an additional purchase was made of two small tracts at the lower end of the Camp ground, thereby giving the State an ocean frontage of some 3000 feet, equal to that of the western boundary line. The total area of the camp ground is now 165 acres acquired at the moderate cost of $88,085.

One of the important improvements is a rifle range fully equipped from firing points to butts with all latest appliances. The range has the entire ocean frontage forming a natural safeguard against accidents, and with firing points ranging from 200 to 1000 yards this range is unexcelled by any rifle range in the United States. On part of the tract bordering on Stockton Lake on the south is the Club House and Administration Building of the New Jersey State Rifle Association. Bulkheads have been constructed in Stockton Lake, filled in and graded, and on them has been constructed a modern Arsenal for the storing of all military property, both State and Federal, for the arming and equipment of the national guard.

There have also been erected administration buildings, concrete kitchens, mess halls, latrines and other supplemental buildings making altogether a splendidly equipped camp ground for both temporary or extended use as may be required in period of peace or mobilization in event of War. Complete facilities for entraining and detraining troops; loading and unloading military stores and transporting animals are afforded by convenient sidings over which the Pennsylvania Railroad, the Central Railroad of New Jersey and the New York and Long Branch Railroad operate.

The building used as the headquarters of the Governor (Commander-in-Chief) is the New Jersey State building used at the Louisiana Purchase Exposition held in St. Louis, moved to and erected at Sea Girt in 1906, and since that time has been the scene of many political and social gatherings during the periods of the annual encampments.

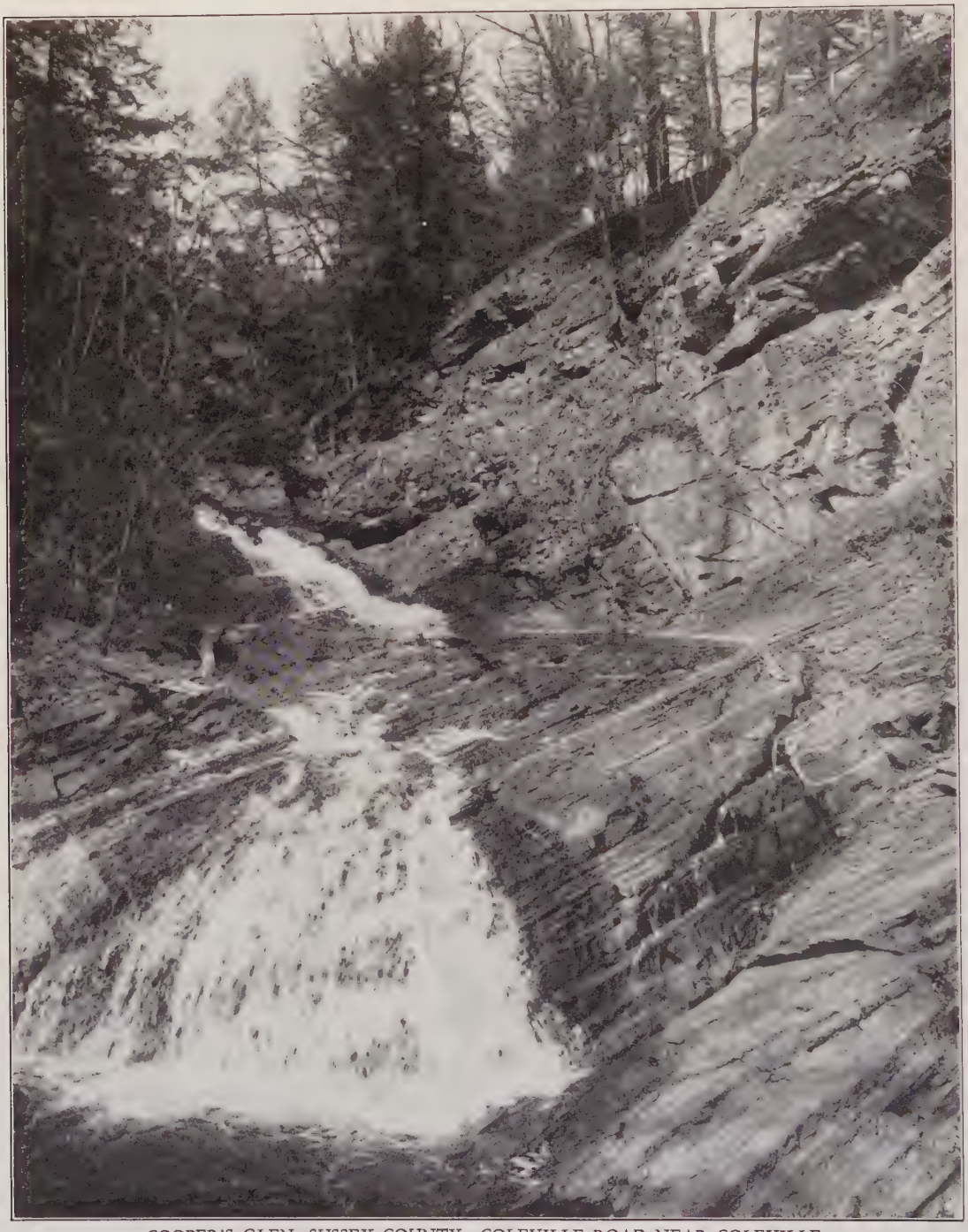
Before the exposition building was brought to Sea Girt the Governor's Headquarters was established in the quaint farm house fronting the roadway to the ocean, known as the "Little White House." Previous to the erection of the present headquarters, this cottage was removed to a position south of the clump of trees on the knoll known as "Little Round Top" facing the parade grounds. This little cottage has become of historical interest for in it have been entertained many National, State and Foreign dignitaries.

The first camp held at Sea Girt was designated as "Camp Abbett" in honor of Governor Leon Abbett and this custom of giving the name of the presiding Chief Executive to the encampments has been adhered to.

During the season of rifle practice the various military units of the State compete for places on the rifle team to represent the State in the National Matches shot annually at Camp Perry, Ohio.

The units of the National Guard training at Sea Girt during the encampment season are the following: Major General and Staff, 44th Division (Headquarters, Newark); Brig.-General and Staff, 57th Infantry Brigade (Headquarters, Camden); 113th Infantry (Headquarters, Newark); 114th Infantry (Headquarters, Camden); 104th Engineers (Headquarters, Englewood); 119th Medical Regiment (Headquarters, Trenton); Special Units (Headquarters, Orange); 102d Cavalry (Headquarters, Newark).

As there are no facilities at the State Camp Grounds, Sea Girt, for artillery practice, the 112th Field Artillery, New Jersey National Guard, takes its summer training at Pine Camp, Great Bend, New York.



COOPER'S GLEN, SUSSEX COUNTY—COLEVILLE ROAD NEAR COLEVILLE
One of the State's most picturesque waterfalls

Chapter II

Natural Resources

GEOLOGY AND MINERAL RESOURCES

New Jersey, for all the unyielding rock and metal in its strata, is an intensely human State, with characteristics that make it lovable. There are those who see forms in its outlines that suggest the human. A giant head and bust facing toward the west, its profile limned by the Delaware, is the favorite comparison of some. There are others who even vision it as the likeness of a mighty Washington, who on its harried soil worked out his dream of Liberty. Others see an armless torso, with the mountains as its sturdy backbone, straining toward the east in the poise of the sculptured figure of Victory that has come down through the centuries. Whatever the noble forms it parallels, it is a land of boundless romance and unending achievement.

It is well to know whereon we stand and just what is under our feet—and this is all that Geology means. So it becomes interesting to be well informed about one's own home, one's own State, its rocky backbone and its clothing of soil and sand.

This is how Geology concerns New Jersey and its people. The great Atlantic Slope of the continent has two "provinces,"—the Appalachian Province and the Coastal Plain. New Jersey rests in both, for the line between them crosses the State diagonally from about Carteret and Woodbridge, in Middlesex County, where the Arthur Kill separates New Jersey from Staten Island, which is part of New York State, and runs to Trenton, in Mercer County, on the Delaware River, which stream divides New Jersey and Pennsylvania.

The great Appalachian Province has four divisions, these zones following a general direction from northeast to southwest, and New Jersey is represented in three of them. Farthest back, or to the northwest, is (1) the Appalachian Plateau, and in this are found the Catskill Mountains, the Pocono Plateau, the Allegheny Plateau, etc., but it does not occur in New Jersey.

Then comes, moving down toward the seashore, (2) the Appalachian Valley—a broad belt of valleys and subordinate ridges, of which the Wallpack Ridge (which guards the very farthest boundary of the State and forms the eastern wall of the Delaware River) and the long Kittatinny Mountain, sometimes called Blue Mountain, and the Kittatinny Valley are the names that concern New Jersey.

The next division is (3) the Appalachian Mountains, represented in New Jersey by the Highlands, but farther south in other States by the mountains lying east of the Cumberland and the Shenandoah valleys. Last of all of the four zones of this Appalachian Province of the Atlantic Slope is (4) the Piedmont Plateau, the hilly lower land lying east of the Highlands and the Appalachian Mountains and between them and the Coastal Plain, which, it will be recalled, is the eastern or shoreward of the two great provinces of the Atlantic Slope. This Piedmont Plateau in New Jersey is essentially the region of the red shale and sandstone with associated traprock ridges, the Triassic area. In this State much of it is so low and level as rather to deserve the name of plain than plateau, except that in Hunterdon County a part of it is a true plateau.

Staying now within the State and confining our geology to it, we have learned that New Jersey itself has four distinct zones or strips that run across the State, roughly from northeast to southwest; and every citizen or resident, proud of the State as he should be, may quickly learn them. Terms should not deter. Triassic means only the third layer of rock, and topog-

raphy is only the surface and its variations that you see as you go around. The "Coastal Plain" then becomes only the sand of the shore and the low-lying pinelands back of it. These four zones of the State may be set out thus:

I. The Appalachian zone, including the Kittatinny Mountain and the Kittatinny Valley.
II. The Highlands.
III. The Red Sandstone area or Triassic Lowland.
IV. The Coastal Plain.

These belts differ characteristically in their geographic features, their underlying bedrock geology, and in their natural resources as well. So that New Jersey has as great a variety of physiographic and climatologic attractions as any other State on the Atlantic Slope can offer. These four belts are to be considered in their order, beginning at the State's western limits, where the Delaware River cuts it off from the rest of the continent, and ending with the eastern edge, bounded by the salty Atlantic.

The first zone of mountain and valley lies in the extreme northwestern part of New Jersey, embracing the northwestern portions of the counties of Sussex and Warren, and has its eastern boundary extending from a point near Unionville, Orange County, New York, to the bend of the Delaware River near Belvidere, Warren County, New Jersey. It is a country of strongly marked ridges and valleys whose trend is northeast to southwest. The long, even-crested Blue or Kittatinny Mountain walls it in on the western edge, except that beyond it is the ridge of the Wallpack along the Delaware. The Kittatinny Mountain comes across from New York State, where it is known as the Shawangunk (shong-gum) Mountain, and extends across into Pennsylvania, where it is also called the Kittatinny.

Here, where the Kittatinny Mountain crosses over into Pennsylvania, the Delaware River trenches the ridge, this being known as the Delaware Water Gap. To the southeast of the Kittatinny is the Great Valley, the Kittatinny Valley, which extends southwestward from Quarryville, Owens and Glenwood, in Sussex County, on the northern boundary of the State, and crosses the Delaware River near the towns of Portland, Pennsylvania, and Columbia and Delaware, in Warren County, New Jersey. This Blue or Kittatinny Ridge is supported by a steeply upturned layer of quartzite, a strong rock of Silurian age, which may be very plainly seen as one passes through the Water Gap. The Gap itself has been slowly sculptured out by the river, by much the same processes that may be witnessed going on today. Frost, rain, and seasonal temperature changes have all done their part in loosening the great blocks of quartzite which lie against the mountainside, ready to be carried away by the river.

The valleys of this area, on the other hand, are underlaid by limestone and slate, rocks which are decidedly inferior to the quartzite of the mountain ridge in their resistance to erosion. The limestone is of a light gray color and is Cambro-Ordovician in geologic age. It is usually found to contain, besides calcium carbonate, the carbonate of magnesium in varying amount, and thus it is a magnesian limestone, or at times a true dolomite. The presence of this rock gives rise to a large and flourishing cement industry, especially in the vicinity of the Delaware. Other belts of this limestone near Phillipsburg are also very extensively and actively worked.

Limestone and dolomite are also good building stones, and as such this rock appears in the construction of many public and private buildings throughout the State. It is also used in crushed form for concrete construction and the surfacing of roads and walks. The slate of this valley is dark gray and of Ordovician age. It has been highly compressed and folded during mountain-building periods in the remote past, and its slaty cleavage is sharp and highly inclined. At certain localities within this belt excellent slate is obtained; the largest workings of the belt are at Bangor, Pennsylvania. Newton, in Sussex County, has afforded in the past a quantity of good slate.

The Highland zone or belt includes a wide strip extending in the same northeast to southwest direction, including the northwest part of Passaic County, crossing the county of Morris and including the southeast portion of

Warren County and the northwest corner of Hunterdon County. Its southeastern border extends from Mahwah in Bergen County, which is adjacent to Suffern, New York, to near Riegelsville, Warren County, on the Delaware River.

The rocks underlying this area are for the most part of granitic types and darker colored varieties, having an arrangement of their component minerals in bands, which gives the rocks the name of gneiss. They are very old. A study of the stage of atomic disintegration shown by some of the radioactive minerals in them indicates that these rocks had already solidified from a state of fusion some 1,200-million years ago. They are Pre-Cambrian, according to the geologic classification, which means that the sedimentary rocks to the northwest and to the southeast were composed of materials largely derived from them and were laid down upon their deeply eroded surface.

The narrow valleys in this Highlands belt, including the Pequest, Musconetcong, and German valleys, are all underlaid by these later sediments and the limestones and slates of Cambrian and Ordovician age. There is, however, one very ancient limestone deposit which is shown in the Highlands that is vastly older, being intruded by the granite and other gneisses in this area, and is therefore the oldest rock in this belt. This is a fine-to-coarse-grained white crystalline calcite marble, known as the Franklin limestone. This formation appears to have had a sedimentary origin, though the surface upon which it was deposited is now lost to sight.

The Franklin limestone is altogether unique in that it carries, in Sussex County, two very large ore deposits, containing extremely varied mineral compounds, 123 species of minerals having been identified among the products of this locality. These deposits are at Franklin and Ogdensburg, and the ore itself consists principally of oxides of zinc, iron, and manganese, with zinc silicate, all of which compounds, though common here, are uncommon or rare in these associations in other parts of the world.

The crystalline rocks of the Highlands also

ONE OF THE HIGHEST STRETCHES OF THE PALISADES CLIFFS
Height 540 feet

WATERFALL IN THE STOKES STATE FOREST

carry magnetic iron ore (magnetite) in quantity. This has been mined here since 1710. The mountains of northern New Jersey were at one time a great source of iron ore. The principal mines were located in these crystalline highlands, and include 89 mines which have produced magnetite ore, some of the largest being the Andover, Byram, Dickerson, Green Pond, Hacklebarney, Hibernia, Hurdtown, Mount Hope, Mount Pleasant, Ogden, Oxford, Richard, Ringwood, Sterling and Teabo mines, all in Morris and Sussex counties. These two counties were the very center of the industry in America.

One of these Jersey mines, the Hurdtown, at the time of its closing in 1898, had reached a depth of 6,000 feet on the slope or 2,600 feet vertically. The Dickerson has been called the oldest iron mine in America. The spathic iron ore of Mine Hill, in Litchfield County, Connecticut, dates from about 1750. There have also been a number of mines which have operated on the brown iron ore, limonite, in a number of counties. The maximum year's output of iron ore for the State was 932,762 tons in 1882. In 1879 there were 16 blast furnaces operating in the State and using home ores almost entirely. There is now little iron mining in New Jersey, depth of operations and competition of the abundant near-surface red hematite ore of the Lake Superior region having rendered it unprofitable.

Some other small mineral deposits exist in this belt of the State. Among these the serpentine asbestos of Montville, Morris County, is worthy of note. Though the product is of excellent quality, the deposit was small and soon exhausted. No anthracite or bituminous coal has so far been located in New Jersey, there being no Carboniferous rocks within its borders; and although there is some lignite coal in the strata of the Coastal Plain, the lignite layers are poor and thin.

The next subdivision to be considered is that generally known as the Triassic Lowland. This area is bounded on the northwest along a line running from the northern State line west of Nyack, New York, southwestward through Bernardsville, in Somerset County, then through Flemington, in Hunterdon County, to the Del-

CLAY PIT AT MAURER IN MIDDLESEX COUNTY

aware River just below Phillipsburg, in Warren County. To the southeast it is bounded by the Hudson River, the hills of northern Staten Island, and the clays and sands which overlap the Triassic along a line from Bonhamton, in Middlesex County, to Trenton.

The Triassic Lowland is an area of gently undulating topography, with the ridges of the Watchung Mountains and the Palisades standing up in somewhat sharp relief. The rocks are for the most part red shale, but in some places, as north of Newark and along the Delaware River above Trenton, reddish brown and white sandstones have in the past supplied the material for the "brownstone fronts" comprising the many rows of residences of the older type in New York and Philadelphia, and for the construction of railroad bridges, culverts, and other public works. The main lines of the Pennsylvania and the Baltimore & Ohio railroads traverse this area of red rocks and soils lengthwise. Hence the erroneous impression often gained by travelers on these railroad lines that New Jersey is "flat and red." They see nothing of its wonderful uplands.

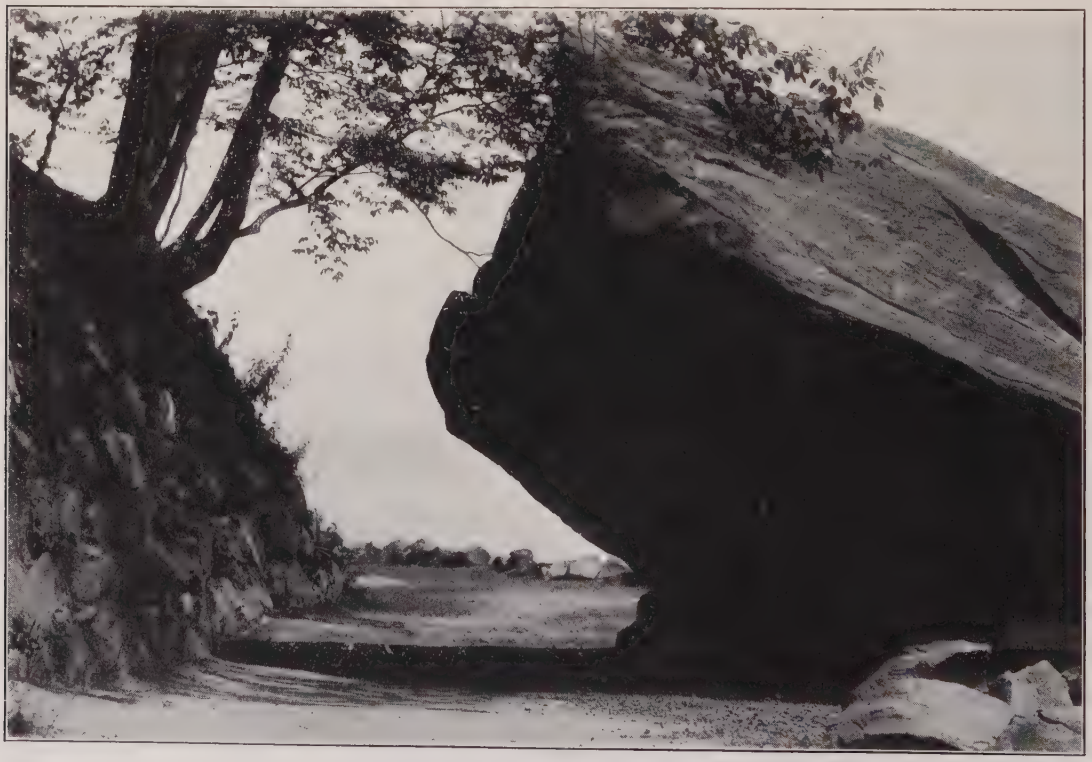
The rocks of this belt have attracted much popular attention on account of the fact that the footprints of lizards and of the dinosaurs, the ancient extinct reptiles, are occasionally found in them. The most productive locality for these fossil remains in New Jersey so far discovered is at Towaco, in Morris County.

The ridges of the Palisades and of the Watchungs are volcanic in origin, the present hills marking the resistant edges of slightly tilted lava flows. The ridges are barriers opposed to east-west transportation to some extent, and especially along the Hudson their physiographic effect and reaction upon mankind are very pronounced. The chief economic product of these ridges is traprock or basalt, quarried at Bound Brook, Plainfield, Scotch Plains, Summit, Montclair, Orange, and West Paterson. This rock is crushed and used for roads and concrete, but its somber cast of color and rusty weathering render it unfit for general use as a building stone. The Watchungs and Palisades have furnished much timber, and are serving as sites for numbers of handsome modern residences.

Copper has been mined in the Triassic rocks in considerable quantity, though all of the mines are now closed, since the removal of the richest ores has left only low-grade deposits that cannot compete with the great deposits of Lake Superior. The old copper mines were worked principally in Revolutionary times. The Schuyler mine at Arlington, north of Newark, furnished copper to make bronze for the cannon of the hard-pressed Continental army. Another mine extends under the Raritan River at the Johnson & Johnson factory in New Brunswick, and its tunnels have repeatedly been encountered in the construction of the buildings on the lower campus of Rutgers University.

The old Griggstown mine, famous locally for the numerous natural copper compounds and other minerals in great variety, can still be found not far from the town of Rocky Hill, Somerset County; and the American mine near Pluckemin, Somerset County, on the slope of the First Watchung ridge, was worked into the present century. The exploratory work done by Thomas A. Edison in the search for copper in the deposit near Menlo Park, Middlesex County, can still be traced. It might also be mentioned that native gold has been found in very small quantities in the rocks at three localities in the State, and native silver at a number of places; these metals are minor constituents of the copper deposits.

The Coastal Plain on the southeast, the last zone under consideration, comprises half of the area of the State. In contrast to the northern and western parts, it is comparatively featureless in its physiographic relief. Its northwestern border lies along a line from Woodbridge, Middlesex County, southwestward through South River to Trenton, beyond which point the Delaware River, on the State line, is its western limit. This plain spans 50 miles at its widest part and is approximately 100 miles long. Its highest elevations rise to nearly 400 feet in the hills near Matawan, Monmouth County, while its southern portion is practically without recognizable features rising above the general level. Its outer margin is fringed



TARGET ROCK, BERGEN COUNTY
Part of a pillar fallen from Palisades centuries ago

GLACIAL FORMATION ON SOUTH MOUNTAIN IN ESSEX COUNTY
Spot in County Reservation of rare interest to nature lovers

with an almost continuous succession of beaches and bars, the work of wave action, mostly accomplished in time of winter storms.

These attractive white sand beaches are occupied by famous summer resorts, among them Atlantic City, Asbury Park, and Cape May. The northern extremity of the bar is terminated by Sandy Hook, a large hooked spit caused by storm waves sweeping into Lower New York Bay. The Navesink at Atlantic Highlands is a sea cliff of former times before the bar was built up. It is the highest point to be viewed from the sea along the entire coast south of Maine, and affords a fortunate location for lighthouses guarding the entrance to one of the world's greatest harbors.

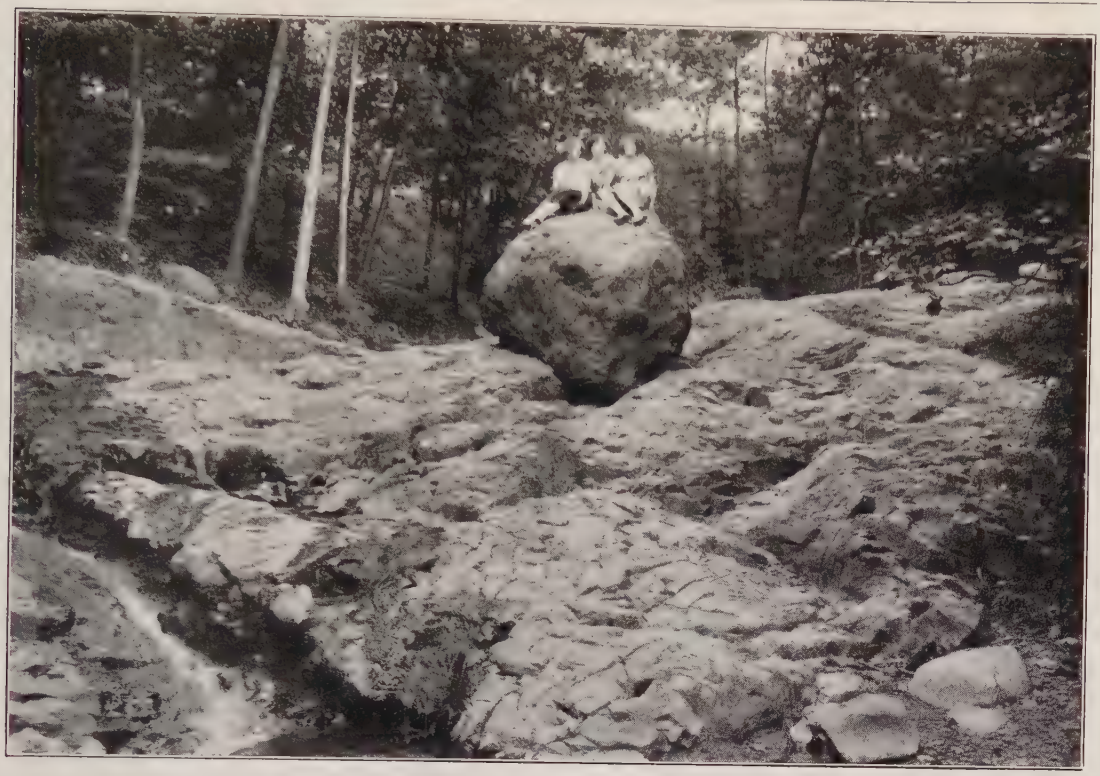
The Coastal Plain is also marked by a great number of lagoons or estuaries behind the bars. All of the major rivers of the coast in this area show old gorges and channels now sunken far below sea level. The Hudson River has such a gorge extending for 150 miles east of Sandy Hook, to the edge of the continental shelf and the border of the very deep ocean. Exploration of this gorge by sounding has shown the presence of an ancient waterfall which is said to be 1000 feet high.

The Coastal Plain is composed of a series of sedimentary beds, Cretaceous in age, of sandy and clayey composition, which are found to have a slight dip or tilt of about 50 feet per mile toward the ocean. As the surface of this area is actually higher in elevation to the eastward, near the ocean, this brings different beds of the sediments to the surface over different parts of the area, with a similar distribution of the economic deposits contained in these beds.

The low western border of the Coastal Plain is underlaid by sands and clays, which extend to the east as far as the hills near Freehold and Matawan, in Monmouth County. The lowermost is a coarse white sand extensively dug for molding purposes. Above this sand and outcropping just to the east of it are the Woodbridge clays. These have for years been dug in the vicinity of the town of that name and at many other places in Middlesex County and are especially desirable for making the finest quality of firebrick and tile. The Cliffwood clays outcrop in a belt including Keyport and Englishtown, in Monmouth County, and points southwest therefrom. From these sandy clays red brick is made.

Following along on the east, and occupying the higher land from Atlantic Highlands through Freehold, is the belt of marls and red sand which afford the rich soil which supports the wonderful market-garden industry of this section of New Jersey. The marl is a greenish colored sandy soil, rich in lime, phosphorus, nitrogen, and iron, thus being in itself an excellent fertilizer. The southernmost part of the Coastal Plain is composed of sandy strata. Its surface is very even and flat except in the sand dunes along the coast. It is covered largely by a pine-barren flora. Certain horizons furnish glass sand of a high degree of purity, as in the vicinity of Vineland, in Cumberland County.

The Coastal Plain has excellent supplies of artesian water, which on account of the dip of the strata are tapped by wells 300 feet deep near South Amboy and at from 1300 to 1500 feet at Asbury Park and Atlantic City. The conditions which have given rise to the great petroleum and natural-gas fields in Texas and Louisiana seem however to be absent in coastal New Jersey, and in the higher parts of the State there are none of the favorable oil-bearing rocks. Unless in small and probably negligible amounts, there is no oil or gas in the older rocks of New Jersey for much the same reason that there is probably no coal.



HOW AND WHEN WAS THIS BOWLDER LANDED UPON SOUTH MOUNTAIN?

THE BROAD, FLAT BEACH AT ATLANTIC CITY

GEOGRAPHY

The geologic and topographic features of New Jersey are so interrelated that it is difficult to cover separately the geography of the State.

The greater part of the Kittatinny Mountain and Valley district and the Highlands lies within the northwestern quadrant of the State, and includes the counties of Sussex and Warren, most of Passaic and Morris, and the northern portions of Hunterdon. The area of the Kittatinny and Highlands sections is approximately 1,650 square miles, the land being generally elevated. Near the New York State line, on the north, the Kittatinny Mountain, a remarkably level-topped and narrow range, rough and rocky, and nearly all wooded, reaches a maximum height of 1,804 feet at High Point. The Kittatinny Valley lies between the Kittatinny Mountain ridge on the northwest and the Highlands on the southeast, trending northeast to southwesterly, and is from 10 to 15 miles wide. It is characterized by its high, rolling hills and minor valleys and its pleasing landscapes and beautiful farming country, which is continuous on the northeast with the valley of Orange County in New York, and to the southwest stretches away into the great Cumberland Valley in Pennsylvania.

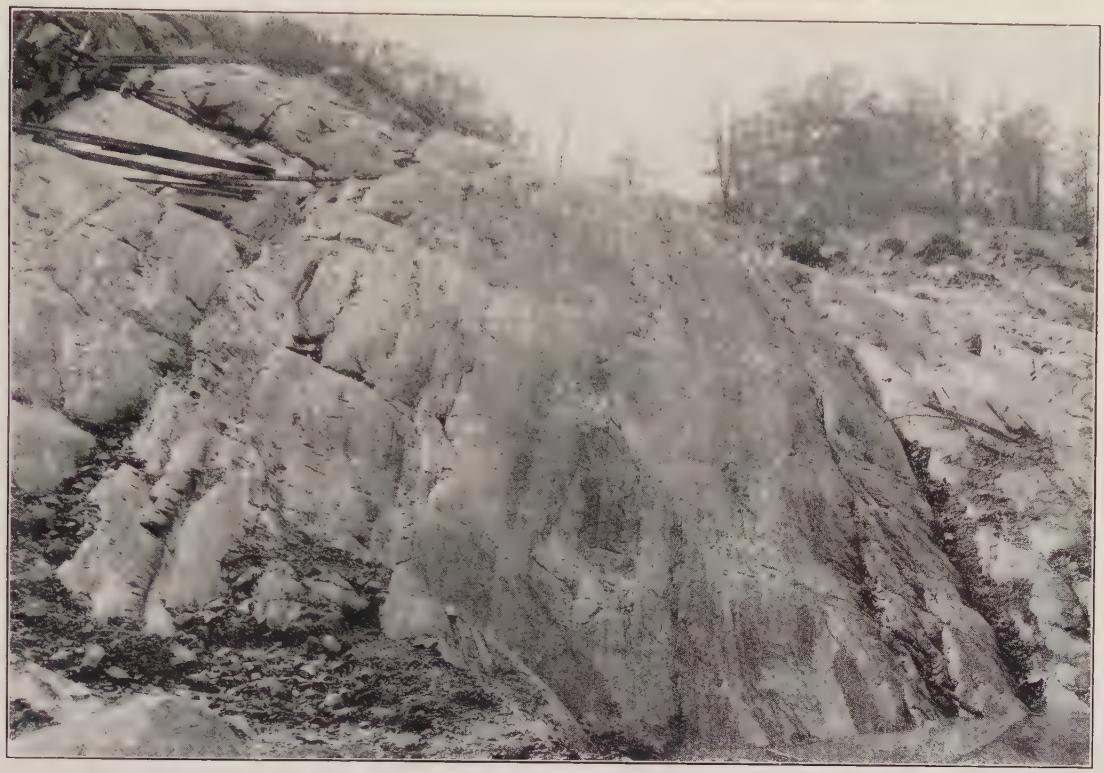
From Delaware Water Gap to Belvidere, the Delaware River crosses the valley transversely in a narrow trench, whose bottom, at Belvidere, is about 220 feet above sea level. Along the New York State line the elevation of the valley varies from 400 feet at the Wallkill River to 1,000 feet near the foot of the Kittatinny Mountain. Two well-defined sub-valleys traverse this district longitudinally, the principal one lying from two and one-half to five miles from the northwest side, while the second lies on the east side, close to the foot of the Highlands plateau. Between the two sub-valleys are broken and irregular shaped ridges, attaining in places a height of about 1,000 feet.

The main drainage streams of the Kittatinny Valley are Papakating Creek and the Wallkill River on the northeast, and the Paulinskill and Pequest Rivers on the southwest, the last two discharging into the Delaware River. There are numerous lakes and ponds scattered through the valley, Swartswood, Culvers and Owassa being the largest. The bottom lands of the Kittatinny Valley are of limestone formation, and they are fertile and well cultivated. The higher lands are slate, and as a rule are not so well fitted for agriculture.

The Highlands plateau lies to the southeast of Kittatinny Valley, and has the same trend, in a general northeast to southwest direction. Its surface is hilly and is made up of several parallel ridges, separated by deep and narrow valleys. The valleys are smooth, cleared and in farms. Much of the northern half of this district is in forest. Bowlders, bare ledges of rock, and drift gravel, the remains of the glacial period, predominate. The southern half of the district is generally free from these rocky formations, timber is relatively scarce, and the land is mostly fertile.

Entering the State from New York, with a width of about 18 miles, the Highlands section has a maximum elevation, near Vernon Township, in Sussex County, of nearly 1,500 feet. On reaching the Delaware River, over the northern portion of Hunterdon County, the region is depressed below 600 feet elevation. The surface of the Highlands is broken by numerous distinct ranges and valleys, chief of which are the Central Highland Plateau and the German-Longwood Valley. The diversities of the surface produce numerous watersheds, those draining the largest areas being the Ramapo on the northeast, the Rockaway on the east, and the Musconetcong on the southwest.

The elevation of the watersheds is sufficient to afford gravity delivery of water, and their nearness to the populous cities of northeastern New Jersey is exceptionally favorable for furnishing valuable water power and public water supply. The northern portion of the Highlands contains several lakes, some of the latter being of marked beauty. The largest, Lake Hopatcong, covers an area of about 2,500 acres.



GLACIAL ROCK SLIDE NEAR WANAQUE
Banding of the rock and glacial striae do not coincide in direction. Glacial movement was up to the left

GLACIAL ROCK SLIDE NEAR WANAQUE
A great contrast to the view above. Smooth floor polished by the ice movement carrying débris across

Greenwood, Macopin, Splitrock, Green Pond, Wawayanda and Budd lakes are among the more important of these natural upland sheets of water. There are many developed or man-made lakes in the State, such as Union, Sunset, Mohawk, Arrowhead, Lenape, Kittatinny, Cranberry, Mountain, Beaver, Indian, not to mention the many reservoirs. In this way several unsightly swamps have become attractive sheets of water.

The subdivision of New Jersey known as the Piedmont or Red Sandstone Plain, so named from the character of its soil, includes the counties of Essex, Hudson, and Union, most of Bergen, Hunterdon, Middlesex, Passaic, and Somerset, and restricted portions of Mercer and Morris. This region lies immediately southeast of the Highlands section, extending from Bergen County on the northeast, southwestward to the Delaware River. Its extreme length is 67 miles, and at the Delaware River it is 30 miles wide; it has an area of approximately 1,500 square miles. At the New York State line the district has a breadth of about 15 miles, and it broadens to slightly more than 30 miles at the Delaware River.

The surface of this district is broken by ridges of traprock hills and mountains, none of the latter attaining any marked elevation. The traprock ridges, known as the Palisades, Watchung, Sourland, Cushetunk, and other mountain ranges, abruptly rise above the general level. They are still heavily forested, whereas the Sandstone country is nearly cleared and in farms. These mountains rise 400 to 900 feet above sea level.

The Red Sandstone Plain is the most densely populated division of the State, the large cities of Newark, Jersey City, Paterson and Elizabeth being situated in the northeastern part. The soil generally is fertile and highly cultivated. The principal watersheds are the Hackensack and the lower part of the Passaic, in the northeast, and the Raritan in the central and southern portions. The southwestern part of the district is drained by several swiftly moving streams that discharge into the Delaware River.

The Coastal Plain zone includes all the country southeast of the Triassic Sandstone area and borders the ocean. It is 100 miles long from Sandy Hook across to Salem on the Delaware, and is 20 to 30 miles wide. The surface is hilly in part, but with gentle slopes, except where some of the streams have cut their way through earthy beds and formed deep-sided stream valleys.

The southern interior is essentially an immense plain of 4400 square miles, the greater portion less than 100 feet elevation. The drainage systems of the southern part of the State are very simple, the streams flowing southeast to the ocean or northwest to the Delaware River. The divide begins near the Navesink Highlands in the extreme northeastern part of Monmouth County, runs westward for about 12 miles, and thence extends in a generally southwesterly direction, passing through Monmouth, Ocean, Burlington, Camden, Gloucester, Salem, and Cumberland counties, with short spurs extending eastward and westward in the southwestern counties. In its extreme northern portion the divide has an elevation ranging from 200 to 391 feet and there is a secondary maximum elevation of about 370 feet in the central part of Monmouth County.

The Manasquan, Metedeconk, Toms, Mullica, and Great Egg Harbor Rivers, with their tributaries, drain most of the southeastern slope of the southern interior, while the extreme southern portion is drained principally by the Maurice River, flowing into the Delaware Bay. Although the streams of southern New Jersey have a relatively small fall, their even flow produces numerous fine waterpowers, several being on the Mullica River.

The soil of the southern interior is made up of alternating beds of sand, gravel, clay, and marl. The clay and marl region on the whole is the most fertile and productive part of the State. The region known as the "Pines" comprises the higher parts of the western and all of the eastern slope south of Long Branch. It is triangular in shape, beginning at a point in the northeast and widening to 50 miles at Delaware Bay, its length being a little less than 100 miles. Pine forests, pure or mixed with oak, interspersed with swamps, cover the greater portion of this region, and only a small part of it is under cultivation, being predominantly sandy.

The seacoast section includes the narrow

strip of sand beaches and tide marshes extending from Sandy Hook to Monmouth Beach, in the extreme northeastern portion of Monmouth County, and from the head of Barnegat Bay to Cape May City, together with that part of the mainland of Monmouth County that borders directly upon the Atlantic Ocean. The sand beaches are separated from the marshes by a series of bays and sounds, connected by a network of narrow and crooked channels, through which boats of light draft may pass. The beaches vary in width from a few rods to one-half mile, and are cut through by numerous inlets at intervals, ranging from more than 20 miles on the north to about two miles near Cape May City. Most of the well-known health and pleasure ocean resorts of New Jersey are along this strip of sand beaches.

RAMAPO RIVER AT DARLINGTON

CLIMATE

The Highlands and the Kittatinny Valley of the State of New Jersey are far enough to the north to lie fairly well within the main storm tracks of the country, and as a result the rains and snows occur in normally ample and regular supply. The summer precipitation, the heaviest of the year, usually comes as an attendant upon thunderstorms. This period of maximum rain shades off to an autumn minimum in October and November.

Much of the precipitation in the winter months is snow, with some sleet and ice storms. In these northern sections snow to a depth of 20 inches sometimes occurs in one storm, and good sleighing for several weeks is frequent, when the ground is bare over much of the southern half of the State.

The rugged irregularities of contour of this part of the State naturally reflect corresponding variations of temperature conditions. The extremes of summer heat are somewhat milder than those of lower elevations and latitude, but the extremes of winter cold are much more severe. The modifying influence of the ocean is largely ineffectual in tempering the cold waves that sweep over the northern regions. On the other hand, the long periods of oppressive heat in the summer are somewhat ameliorated in this division of the State. The extreme temperature range, which may be anticipated as not being extraordinary, lies from 100 degrees above to 20 degrees below zero.

The Red Sandstone Plain very frequently experiences weather conditions of either a continental or oceanic type. It is somewhat protected by the barriers of the Appalachians to the northwest, and not all the great force of the cyclonic movements across the northern portions of the country reach this region. Storms that travel northeastward along the Atlantic Coast are also warded off slightly by the outlying coastal plain and barrier islands. The temperature and rainfall conditions are much the same as in the southern interior. It is slightly warmer than the Highlands, with a lessened range of extremes.

The daily temperature changes in this region are least noticeable during the middle of July, but previous thereto the regular gain in heat is readily apparent and constant. After the middle of July the decline in warmth becomes noticeable. The time from about January 10 to February 10 is the coldest season of the year. Periods of pronounced moisture and warmth from the ocean sometimes occur, but are less intense than in the southern interior. Occasionally the most severe winter conditions entirely overspread this section and persist for two to three weeks at a time, and the opposite extreme sometimes occurs, when the ground remains snow covered but a few hours at a time during an entire winter and when streams and ponds are unfrozen.

The relative humidity of this region, the eastern portion of which contains a great concentration of population and large numbers of manufacturing plants, is a subject of much popular interest, especially in the warm periods of the year. There are conjunctions of excessive urban heat and oceanic moisture that occur some few times each summer, lasting for a day or two, that interfere appreciably with manufacturing processes and in rare instances cause physical prostration.

The Atlantic Ocean on the east and Delaware Bay on the southwest exert a marked influence on the climate of southern New Jersey, the modifying effects of the ocean being most pronounced for a distance of from five to ten miles inland from the coast line.

The entire southern interior shows but slight variation in mean temperature, the difference being about four degrees both midwinter and midsummer between northern and southern sections of this division of the State. There are, along the divide between eastern and western drainage, various localities where radiation is notably great on clear, quiet nights, especially in the "Pines" and on the cranberry bogs, resulting in early and late frosts.

Rainfall is relatively constant and fairly

WINTER SCENE IN UNION COUNTY

TROPICAL SCENE?
No. Summer in Stokes State Forest, Sussex County

equally distributed, both as to season and location. There is a marked dry season in the fall of the year, but the deficiency is not great enough to warrant a comparison with the dry seasons of many of the western sections of the country. In extreme south portions there are many winters without appreciable snow, and occasionally this condition prevails over the whole southern region.

As to temperature, the seacoast is usually much affected by its proximity to the ocean, with lesser ranges of daily, monthly, and annual extremes. The extreme heat of early summer lags in its advance, owing to the modifying oceanic influence, and the occasional intense heat of the interior does not approach the shore. Thus the almost continuous sandy beach shore from Sandy Hook to Cape May affords playground recreation for millions of vacationists from all over the country.

GLEN IN STOKES STATE FOREST, SUSSEX COUNTY

FOREST RESOURCES

The forests of New Jersey have contributed largely to the development of the State. There was a vast storehouse of forest wealth and a thriving lumber business in the early days, and the growth of the State has gone hand in hand with the exploitation of this natural wealth. The forests now reach out into nearly every industry in the State.

In common with the general forest history of America, the use of New Jersey's forest resources has been wasteful. The best was immediately usable and was taken; the remainder had no immediate value and was ignored. In addition, the forest cover was stripped from many areas for settlement or agriculture. Because of these conditions, the State's forest history is a story of wasteful use and of indifference to the damage done to the remaining timber, primarily by fire.

There are 2,000,000 acres within the State naturally maintained as forest areas. There is a "hardwood" region of three-eighths of this area lying north and west of a line from Seabright to Glassboro to Bridgeton and a "pine" region of five-eighths of this area lying south and east of the same line.

The hardwood region contains deciduous species such as oak, chestnut, maple, hickory, beech, tulip poplar, ash, birch, gum, and elm, with small quantities of the conifers, such as white and pitch pine, red cedar, and hemlock. The pine region contains pitch pine, shortleaf pine, and white cedar, with considerable oak on the better soils.

Of the whole forest area nearly seven-tenths has been so recently cut over or so severely burned that the tree growth on it, while potentially valuable in three species that make good timber, is yet too small to be merchantable. In the south Jersey section the soils are mostly natural pine land, and it may be assumed that pine will largely replace the hardwoods and be the future crop.

The remaining three-tenths of the total forest area contains merchantable timber, estimated at 1,640,000,000 board feet of saw timber, poles, ties, and piling, and 5,000,000 cords of fuel wood. This comprises all the hardwoods, with white pine, hemlock, yellow pine, and cedar. There is four times as much pine as cedar, but the merchantable yield from cedar is far higher than from the pine because it is usable to extremely small sizes.

The merchantable timber of the State has a stumpage value of $25,000,000, the yearly cut is $2,000,000, and the market value of the products, as sawed lumber, poles, ties, and cordwood, is $10,000,000.

If the tide marsh and beaches be excluded, New Jersey's 2,000,000 acres of forest represent 46 per cent of the land. The fundamental principle of forestry is to encourage timber growing only on land not more valuable for other use. The forest, unlike other crops, gives fertility to the soil.

Possibly one-quarter of the forest area is suitable for agriculture. But for years such forest land as has been cleared for agricultural or other development has been closely balanced by abandoned fields reverting to woodland. There are 400,000 acres of deserted farms in New Jersey, and the need is for more farmers and not more farms. The present forest land should anticipate no other use until it has grown at least one crop of timber.

New Jersey consumes 600,000,000 board feet of timber annually, of which half is sawed lumber used in industries and for construction, and half is rough form used for poles, ties, piling, mine timbers, posts, and fuel. The annual output of the sawmills in the State is not over one-tenth of the sawed lumber consumed, leaving nine-tenths to be imported. On the other hand, about two-thirds of the round and rough timber used in the State is produced locally. Very little New Jersey timber is exported.

The forest industry of the State is necessarily at low ebb, and the total production small as compared with the capacity of the State's forest soils. The products are of low quality in most instances, partly because of the inferior quality of much of the standing timber as the

A MATURE STAND OF MERCHANTABLE HARDWOOD TIMBER IN NORTHERN NEW JERSEY

AN OLD "WOODS ROAD" IN NORTHERN NEW JERSEY

result of the recurrent fires and the continual culling of the woodlands, and also because of the nature of the operations, for New Jersey's lumbering and sawmill work is of necessity temporary and intermittent. There are between 200 and 300 sawmills operating in the State, employing 2,000 men. Not less than 200 other operators are producing ties, poles, posts, fuel wood, piling, and a variety of other rough and unsawed material, using 1,000 men. Also thousands of farmers get out cordwood, ties, posts, and other products during their slack work period in winter.

The personnel and location of the lumbering and logging operations are continually changing, and most of the operators are dependent upon other lines of work, such as farming, contracting, and dealing. Few mills or operations run steadily throughout the year.

The wood-using industries of the State import the greater part of their timber and lumber. There are hundreds of such industries, producing agricultural implements, baskets, boxes and crates, car construction, caskets, chairs, cigar and tobacco boxes, electrical apparatus, elevators, house fixtures, furniture, handles, machinery, musical instruments, patterns and flasks, planing-mill products, professional and scientific instruments, refrigerators, sash, doors, blinds and general millwork, ships and boatbuilding, shuttles and spools and bobbins, tanks, trunks, vehicles and vehicle parts, woodenware and novelties, barrels and casks, excelsior, matches, toys, bungs and faucets, rollers, paving blocks, sporting and athletic goods, shoe lasts, treated timbers, ties, and a variety of minor products.

Forest products play their part in many ways in maintaining industrial or commercial life. The transportation and communication facilities are vitally dependent upon the woodlands for ties, piling, posts, poles, and fenders. The industrial, commercial, and agricultural interests need baskets, boxes, crates, barrels, and other containers, besides excelsior and packing materials. The mining industry requires ties, timbers, and other woodland products. Smelter poles, charcoal, and various special forms are required in other industries.

Forestry bears an important relation to the public welfare in the field of recreation. Year by year the number of those using the woodlands for their playgrounds increases.

A reorganized Forest Fire Service took the field in October, 1923, under which rapid improvement has been made in providing adequate protection from fire in the woodlands. There are 1,000 fires on an average reported annually, caused about equally by railroad operation, smokers, brush burning and campfires. The average annual fire loss in merchantable timber and improved property is a third of a million dollars.

An average annual merchantable growth of 300 board feet per acre is possible when the forests have been protected from fire and made efficient under forestry management. When the 25 or more years have given a fully productive stand of timber, it can thereafter be maintained as such. The State's 2,000,000 acres of forest land would then furnish much of its timber needs.

The State maintains a Forestry Division in its Department of Conservation and Development with power to acquire and manage land for forestry use, to enforce the legislation for forest protection and development, and to advise and assist the private owner in scientific forest management. Under a forester the general development of the State forests and the forest fire service are handled by a permanent force of 40 technical foresters and fire wardens. There is a large corps of local fire wardens, lookout watchmen, and rangers.

More than 200 owners have undertaken forestry work in their woodlands, these controlling one-tenth of the forest area of the State. There have been over 2,000 acres of open land planted to forest trees. State forests practically support themselves from the income they produce.

As the State must lead the way in the redemption of the vast area of idle land, (if it is to be recovered for use within this generation,) the department is working on a program for State ownership and management of not less than 200,000 acres of desirable land for State forests. This is being done to insure a prompt beginning in timber production by demonstrating the profit in forestry to private owners. It is

A ROAD IN THE PINES OF SOUTH JERSEY IN THE COASTAL PLAIN SANDS

MATURE SHORT LEAF PINE TIMBER GROWTH IN SOUTH JERSEY SANDY SOILS. TYPICAL OF WHAT CAN BE RAISED ON THE COASTAL PLAIN

expected that this plan will result in the production of large sizes and special species from which the profits are less and which demand long-time management. Such a scheme will also provide permanent acres of wild land for outdoor recreation.

FISHERY RESOURCES

New Jersey ranks among the first six States in the nation in the value of her fisheries, the annual amount of which is $6,000,000. The State is practically a peninsula bounded on the west side by the Delaware River and Bay and on the east by the Hudson River, New York Bay, Kill van Kull, Arthur Kill, Raritan and Sandy Hook bays and the Atlantic Ocean.

The numerous pound fisheries along the Atlantic coast are busy the greater part of the year and form a picturesque feature of the shore line. Their proximity to the large cities, coupled with railroad freight service of high excellence, places these fishing operators in a highly favorable situation in getting their catch to market. Fleets of power boats, with nets, hauling machinery, cleaning sheds, ice-making plants and storehouses, form an equipment calling for a large investment and indicate clearly that the industry is stable and profitable.

The pounds consist of huge nets attached to stakes. The tallest trees are used for these, as they must be sunk deep into the sandy bottom, rise through seven fathoms of water, and project above high tide for 10 feet. One of the sides of the pound is continued in each direction, with stakes and rope nets; and the fish on meeting these barriers swim along to the funnel-like entrance to the pound.

Auxiliary fleets using handlines add to the catch according to the variety of the fish and the seasonal run. Mackerel and bluefish, weakfish, cod, shad, and even the tuna are among the marketable catch. On the westerly shore are the Delaware shad and sturgeon fisheries.

The oyster beds and the fleets that tend them add to the State's wealth from the far-famed favorable localities of Delaware Bay and Maurice Cove and around the southern and eastern shore to Maurice River. Even crab catching is on a commercial plane.

On the eastern shore surf-casting and line fishing for weakfish, croakers, flounders, and similar fish, while classed non-commercially as sport fishing, add much to the State's commercial gain because of the countless thousands of fishermen who visit the New Jersey coast every year, furnishing an income for thousands of citizens, including hotel-keepers, boatmen, and motor mechanics.

The State is richly blessed by nature in respect to its rivers and creeks and in the supply of foodfish in its waters. This benefit has been largely preserved by the policy of protection and conservation. The license fees of New Jersey sportsmen in one year made it possible for the State Fish and Game Commission to add 100,000,000 fish to the piscatorial population. The fish were distributed in every lake and stream where temperature and freedom from pollution furnished conditions that would sustain fish life.

Most of these fish were reared at the State fish hatchery at Hackettstown, and included brook trout, Lockleven trout, brown trout, rainbow trout, large mouth bass, small mouth bass, bluegill sunfish, catfish, yellow perch and pickerel. Other sources of supply were shad and white perch from the branch hatchery at Pennsville; bass, perch, crappie, pickerel and sunfish netted from the Orange and Boonton reservoirs; and brook trout and other fish bought from outside hatcheries.

In the early days of the settlement of New Jersey it was found to be a custom of the Indians from as far distant as the Middle West to travel to the coast and gather and roast shell fish, more especially the quohog or hard clam, after which they were dried and strung, and then carried back to the inland tribes. As only the matured shellfish were gathered by the Indians and the settlers from these natural beds, there was always an abundant supply, but as the settlements along the coast grew it was soon found that shells could be used,

and then began the depletion of the natural oyster beds. The shells, together with the shellfish growing thereon, were burned for lime to use in the manufacture of iron.

In 1846 a legislative act closed the oyster beds during the summer months. Some of those who gathered oysters for market carried their catch to the markets of New York and Philadelphia by boat. Some Delaware Bay oystermen finding the market overstocked, took their cargo back and put the oysters overboard near their homes. By fall the oysters had made such a remarkable growth that these men gained the idea of catching the small oysters from their natural shallow beds and planting them in the more salty waters of the bays. In consequence of this discovery of transplanting, this became the universal practice, but it soon depleted the natural beds.

In 1861 the freeholders of Monmouth County were given the power to lease parts of Shark River for oyster cultivation, this being the first law authorizing the leasing of grounds for that purpose. As the planting increased and New Jersey seed oysters began to be shipped into New York, Connecticut, and Rhode Island, it was found that the beds would soon be destroyed. Laws were passed, but enforcement was left to the oystermen themselves, and so no one separated the oysters from the shells and threw the shells back on the beds for the young oysters to attach to. Depletion continued until New Jersey planters had to go to Long Island Sound for their seed oysters. This seed grew rapidly and made the finest oysters grown in the bays along the coast of New Jersey.

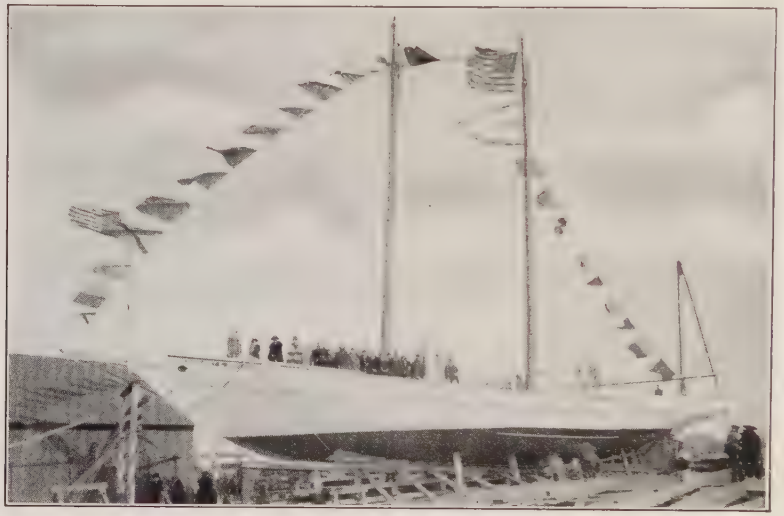
In 1893 a law divided the State into seven districts with a commission of 14 members to promote the propagation and growth of seed oysters and to protect the natural seed grounds. Thus began the first real improvement of the oyster beds, as these men enforced the culling acts and the spreading of shells on the depleted beds. Another law gave the planters association of Maurice River Cove power to make rules to govern the industry, to employ guards, and to assess fees. This in a measure was a success, but in 1899 the State control bill was passed, and this proved to be the real beginning

OYSTER FLEET AT BIVALVE, GOING OUT AT 4 A. M.

SHELLS RETURNED TO WATER IN SPRING—OYSTERS SPAWN ON THEM IN JULY

DREDGING OYSTERS, DELAWARE BAY

SHIP JOHN LIGHT, DELAWARE BAY—NOTABLE TO SAILORS



LAUNCHING OYSTER BOAT OF THE BEST DESIGN AT GREENWICH

of the great development of the oyster industry in that section of Delaware Bay known as the Maurice River Cove. One survey disclosed that 4,500,000 bushels of oysters are gathered and planted yearly from this vast bed and that a first day of the season haul has totaled a third of a million bushels.

The oyster industry at the mouth of the Maurice River generally employs 300 boats and 3,000 men. Boats range from 80 to 110 feet in length and are usually motor driven.

In 1915 an act consolidated the several commissions into the Board of Shell Fisheries, and another act passed in 1917 enlarged its powers. The estimated value of the shellfish shipped from and consumed in the State is $10,500,000, and shells to replace those that are carried away are being spread on the natural beds to which the young oysters are attached. Federal and State supervision works for the purifying of the waters in which shellfish grow, and where correction of pollution cannot be effected these sections have been condemned and shellfish are not allowed to be cultivated thereon or taken therefrom.

An inquiry into the nutritive value of the protein of fish as compared with that of land animals might lead to recommendations that seafood be given a more prominent place in the human dietary and also more extensive use might be found for waste products of this industry in agriculture.

OYSTER BOAT ARRIVING AT PORT NORRIS

SACKING OYSTERS FOR SHIPMENT, BIVALVE

LAYING OUT OYSTERS AT BIVALVE

TAKING UP OYSTERS AT BIVALVE

CANNING RAW OYSTERS AT PORT NORRIS

Chapter III

The People and Religions

THE PEOPLE

The land lying between the Hudson and Delaware Rivers seemed to be a promising home for Seventeenth Century immigrants to the New World. There were harbors and navigable waters, the soil was fertile, the climate more temperate than that of New England, and the Indians were friendly.

Swedes, Dutchmen, Englishmen, and Scotchmen were attracted to "Nova Caesarea," as the region was called. The Swedes located chiefly along the banks of the Delaware. The Dutchmen chose the northeastern section in proximity to New Amsterdam (New York) and partly in the Raritan Valley. The Scots preferred the fertile central part around Raritan Bay and directly south. The English were distributed throughout the region, although the Quakers concentrated along the Delaware River.

This diversity of population in colonial times served to enrich New Jersey. With differences of thought, of customs, and of temperament, and coming from lands with different agricultural practices, each group of people contributed its peculiarities and special experiences to the farming of Nova Caesarea, for in one respect they were all alike—their chief occupation was agriculture.

Since that time the immigrants have been a very important element in the population of New Jersey. Of later years their gateway to the New World has been an island off its shores and on another is placed the friendly beacon of Liberty. In 1920, when the last authentic data were available, there were among the residents of this State those who could claim American-born parentage of at least two generations to a number that was 38.3 per cent of the population; Americans of one generation, 34.3 per cent; foreign-born, 23.4 per cent; and negroes and others, 3.7 per cent.

In the percentage of foreign-born and those of foreign and mixed parentage, the State of New Jersey ranks high among the other States of the Union. Not less than 20.7 per cent of the present citizens of New Jersey migrated here from other parts of America. This is a higher percentage than is found for any other State except Delaware. Negroes, Chinese, Japanese, and Indians constituted, in 1920, only 3.7 per cent of all the population of New Jersey as compared with 10.3 per cent for the United States and 2.5 per cent for the Middle Atlantic geographical division.

Population Growth

In 1920 there were 3,155,900 residents in the State of New Jersey. Although it stands forty-fifth in area among the other States of the Union, it ranked tenth in its total population and third in population on the basis of land area.

Between 1910 and 1920 the population increased 24 per cent, while that of the entire nation increased but 14 per cent. Since 1860, the general growth of population in this State has been greater than the average percentage of increase for the United States.

Eighteen counties of the State of New Jersey show an increase in population from 1910 to 1920, and only three—Cape May, Hunterdon, and Sussex—show a decrease. The total land area of the State is but 7,514 square miles. The average number of inhabitants to the square mile in 1920 was 420.0; in 1910 it was 337.7; and in 1900 only 250.7.

In density of population the State is exceeded only by Massachusetts and Rhode Island, yet neither of these latter States

SHAD FISHING ON MAURICE RIVER

showed an increase in population at a rate equal to that of New Jersey between 1910 and 1920. In those ten years 82.3 persons per square mile were added to the population of New Jersey, whereas the number of persons per square mile in Rhode Island increased only 57.9 and the number in Massachusetts 60.4. This growth of population and its density has not been uniform, however, but is confined largely to specific areas.

Over 75 per cent of the whole population is found in seven of the 21 counties of the State—Hudson, Essex, Passaic, Bergen, Union, Camden, and part of Middlesex—and over 78 per cent (2,474,936 persons out of 3,155,900 in 1920) is in cities and towns of more than 2,500 inhabitants.

There are three highly developed industrial sections in this State with a density of population higher than the average for the State. These are the Metropolitan section, which takes in Hudson, Essex, Passaic, Bergen, Union, and parts of Middlesex and Monmouth counties, which being adjacent to New York have a total population of over 2,200,000, or 74.2 per cent of the population of the State; Philadelphia-Camden section, which is Camden County, with a population of 190,508, or 6 per cent; and the Trenton section, including Mercer and part of Burlington counties, with a population of over 200,000, or 6.3 per cent. The remaining 546,796, or 13.5 per cent, are distributed over the other eleven counties of New Jersey.

POPULATION JULY 1, 1928—ESTIMATED BY BUREAU OF CENSUS

New Jersey	3,821,000		
Atlantic City	54,700	Newark	473,600
Bayonne	95,300	Orange	36,500
Camden	135,400	Passaic	71,800
East Orange	65,000	Paterson	144,900
Jersey City	324,700	Perth Amboy	50,100
New Brunswick	40,800	Trenton	139,000
Union City	64,400		

The great industrial growth of the State in consequence of its exceptionally favorable conditions may be demonstrated by the fact that, including its nearest neighbors, there is found within 60 miles of the capital at Trenton more than a tenth of the whole population of the United States. The center of population in the State in 1920 was at New Brunswick, in Middlesex County.

The Atlantic coast-line area of New Jersey is famous for its summer resorts—centers with world-wide reputations, such as Atlantic City. Over a million temporary residents live in the counties of Cape May, Atlantic, Ocean, and Monmouth during the summer season.

Occupations

The proportion of the population in the State of New Jersey engaged in what for lack of a more inclusive and fitting term have come to be called the gainful occupations, was equal to or higher than that in the whole Union or more than that in the Middle Atlantic division for the last 40 years, with the single exception of the records taken in 1910. Comparative figures for the proportion of people engaged in different occupations place the State of New Jersey among the most highly developed industrial regions of the United States.

Among the 61,153 persons engaged in agriculture in 1920 there were, in general farming, as farmers, dairymen, and stock raisers, 21,415; as foremen on farms, 1,177; and as laborers on farms, 21,179. In 1920 there were 29,702 farms of all kinds in the State. The number of farms, total amount of farm land, and improved land on farms, and the average acreage per farm are gradually decreasing, but the value of farm capital and the average value per farm and per acre have been constantly increasing in the last several decades.

A large number of people are engaged in fisheries in New Jersey. The tidal grounds in the bays of Raritan and Sandy Hook and in areas in Great Bay, Little Egg Harbor, Barnegat Bay and numerous sounds and inlets along the coast, but mainly in Delaware Bay, yield many millions worth of oysters and clams

OLD ST. MARY'S CHURCH AT BURLINGTON

annually. Protected and controlled through appropriate legislation, this industry keeps 2,048 special enterprises of fishermen and oystermen here.

Manufacturing and mechanical industries in New Jersey, with their 8,204 establishments, 425,377 wage earners, $576,235,826 paid in wages, and $3,539,181,253 worth of manufactured products in 1925, are the main sources of livelihood for 47.9 per cent of the persons engaged in gainful occupations in 1919. New Jersey ranked seventh in 1925 in manufacturing, being surpassed only by New York, Pennsylvania, Illinois, Ohio, Massachusetts, and California.

Located in the heart of the country's system of communications, from which its main arteries radiate in all directions, with easy access to two great ocean ports, the State of New Jersey ranks first among the States of the country in respect to communication facilities, on the basis of area. With 6,211 track miles of steam railroads and 1,291 track miles of electric railroads; with excellent facilities on the Jersey sides of New York and Philadelphia, with a number of streams used for minor shipping, and, last but not least, with its 17,000 miles of rural roads, of which 6,669 miles (39 per cent) are hard surfaced; the State provided employment for 111,115 persons in transportation in 1920. This number was 8.4 per cent of persons employed in the State.

Over 144,000 persons were employed in trade in New Jersey according to the census of 1920. Among the clerical occupations the bookkeepers (30,671), clerks (80,404), and stenographers and typists (28,606), are most numerous, though all the occupations of this group enroll 151,226 persons.

Professional service in 1920 engaged 70,119 persons, including 20,287 teachers, 3,504 doctors, 3,918 lawyers, and 3,316 clergymen. There were 34,624 people employed in public service, 104,213 in domestic service, and 3,935 were enlisted in the fields of mining and metallurgy.

RELIGION

The religion of the people of New Jersey is as varied as one might expect that it would be in a community with such an unusually cosmopolitan population. The early settlement of several different nationalities within its present borders gave rise to the firm establishment in the State of religions that are hardly known even to-day in many of the other original thirteen States. Then, too, as New Jersey was the cross-road between the larger colonies to the north and to the south others were influenced to overflow into the State in considerable numbers, and still others became thriving organizations with the immigration influx of the Nineteenth Century.

No population can be completely classified by religions. An authentic census of this sort is impossible because thousands who are actual adherents of the so-called Protestant denominations do not formally affiliate with any particular church. Nevertheless, it appears from the facts at hand that close to 2,250,000 of the estimated present population of 3,821,000 are positively identified with some religion.

Presbyterian Church

Presbyterianism organically began in New Jersey when in 1792 the "Old Scots Church" of Freehold, was founded. A Scotchman, Walter Ker, banished for his faith, crossed to America and was the leading spirit in organizing this church. It stood on Free Hill, where now stands, at Wickatuck, the Presbyterian memorial monument in the midst of the ancient cemetery. Here was held the first recorded meeting of the Presbytery of Philadelphia, December 29, 1706, to ordain John Boyd, the first pastor of "Old Scots," and the first Presbyterian minister to be ordained in America. "Old Scots" was finally abandoned and a new church, now "Old Tennant," some ten miles distant, became the center of worship for the Freehold people. Here the famous Tennants, John and

FIRST PRESBYTERIAN CHURCH, NEWARK

Dedicated 1791. Known as "Old First." Society organized as Congregational in 1666. First Pastor, Rev. Abraham Pierson. Second pastor, Rev. Abraham Pierson, Jr., founded Yale College and was its first president. Second president of Princeton was Rev. Aaron Burr, pastor of "Old First." Rev. Jonathan Dickinson, an Elizabeth pastor, started the college in his home but died within a year and the college was transferred to the Burr Manse, William and Broad Streets, Newark.

William successively, preached for many years, with sometimes Gilbert as visitor.

There had been Presbyterian ministers in America before 1706, but there was no organization. Some of the preachers of New England and the Middle Colonies occupied pulpits in so-called Congregational churches. These churches, like those of Newark, Woodbridge and Elizabeth, began to ally themselves with the Presbytery of Philadelphia and gradually Presbyterians grew in favor and in strength.

Rev. Francis Makemie, who was jailed by Lord Cornbury for preaching in New Jersey and New York without his lordship's particular license, though acquitted on trial by the judges on the basis of the Toleration Act, had been the leader in the establishment of the Presbytery of Philadelphia, to which New Jersey Presbyterian churches originally adhered. It is due to the Scotch and Scotch-Irish element of the population of New Jersey that Presbyterianism won its way in the colony. They began to come here about 1682 in considerable numbers, and it was their influence which led to the formation of the many Presbyterian churches of the Eighteenth Century. However, there were many preachers of New England origin, like the second Abraham Pierson of Newark, later the founder of Yale College, and the famous controversialist, Jonathan Dickinson of Elizabeth, who had Presbyterian leanings, and their influence played a large part in the early progress of New Jersey Presbyterianism.

The State organization of the church is known as the "Synod of New Jersey." Dr. James Steele of Rutherford is the present Moderator. The Synod comprises 10 Presbyteries in which there are now 448 church edifices, 625 ministers, 152,211 communicant members, and 178,599 Sunday School members.

Congregational Church

Congregationalism came to America from England with the Pilgrims, and was closely identified with the great Puritan movement. As a consequence, it first took root and grew in New England, but as the scope of the new country widened, Congregationalism proceeded with it. It is stated on good authority that long before the Revolution a number of Congregational churches were founded in eastern New York, and several on Long Island.

New Jersey Congregationalism goes back to the beginning of Newark, and actually means the beginning of that city. In May, 1666, 30 New England families came to that locality as settlers, making their purchase of land directly from the Indians. They considered it to be their first duty as settlers to form a church, this church being Congregational in polity. They selected for their minister Rev. Abraham Pierson of Connecticut, who was a native of Yorkshire, England, and a graduate of Trinity College, Cambridge. Curiously enough, he was ordained to the Christian ministry in Newark, England.

From that time, Congregational churches sprang up elsewhere in the state. Later the churches of this faith in northern New Jersey considered themselves to be the indirect offshoots of the first church formed in what is now Newark. New Jersey Congregationalism also received impetus from Connecticut and from Long Island.

At present there are 51 Congregational churches in the state, 53 ministers, and 30 parsonages.

Episcopal Church

The Episcopal Church was established at Perth Amboy as early as 1698 and in other parts of the State, notably at Burlington Nov. 1, 1702, as a result of the incorporation in London, England, the previous year, of "The Society for the Propagation of the Gospel in Foreign Parts." George Keith, who received orders in the Church of England, became the first missionary of the society in the American Colonies and preached first in Perth Amboy.

Rev. John Talbot, who accompanied Keith, laid the corner stone of the old church in Burlington March 25, 1703 and remained as permanent missionary until 1725. He is regarded as the father of the church in New Jersey.

Nineteen parishes and missions were established in the State before the Revolutionary War. Rev. Samuel Seabury, first bishop of the American church, began his career in New

Jersey. He was in charge of Christ Church, New Brunswick, 1756–1758.

The movement to constitute one Episcopal Church for the whole United States was begun at an informal meeting of churchmen from New York, Pennsylvania, and New Jersey at Christ Church, New Brunswick, May 11, 1784. The "Thirty-Nine Articles of Religion" were established at the General Convention of the Church held in St. Michael's Church, Trenton, in 1801. This was the only meeting of the general convention that has been held in this State. There were but six members of the House of Bishops that year.

New Jersey was the ninth State to be provided with its own bishop. That was in 1815, when the Diocesan Convention was held in St. Michael's Church, Trenton. Dr. John Croes was the first bishop. He was rector of Christ Church, New Brunswick, but he was consecrated bishop in St. Peter's Church, Philadelphia. Bishop Doane, then rector of Trinity Church, Boston, was elected the second bishop in 1832 and made his home in Burlington. He founded St. Mary's School in that town in 1837—the second oldest girls' school of the Episcopal Church in the United States.

The diocese was divided in 1874, the northern portion becoming the Diocese of Newark and the southern portion remaining the Diocese of New Jersey. The latter now has 188 parishes and missions, 160 canonically connected clergymen, 180 church edifices, and 31,596 communicants. The Diocese of Newark has 153 parishes and missions, 177 canonically connected clergymen, 148 church buildings, 84 parish houses, 103 rectories, and 51,867 communicants.

Baptist Church

Three settlements mark the beginnings of the Baptists in New Jersey. The first was at Middletown, but its members came from a wider territory than the little village, so that it is more often spoken of as "The Middletown and Holmdel Church," or "Churches." The first meeting was held in 1667. The Church was organized in 1688. A genealogist of the

SOPHIA ASTLEY KIRKPATRICK MEMORIAL CHAPEL, RUTGERS UNIVERSITY
Contains the oil portraits of all the past presidents and great men of Rutgers.

FRIENDS' MEETING HOUSE AND SCHOOL, ATLANTIC CITY

Holmes Family says that the doughty old warrior, Obadiah Holmes, Sr., was present at the organization. The pioneer folk who constituted this church brought their own minister with them. He was James Ashton, who in addition to his pastoral duties "worked a farm" west of Holmdel.

The second was at Cohansey. The first meeting there was in 1683, but the church was not organized until 1690. Dr. Thomas S. Griffiths, whose name indicates his Welsh descent, in his "History of the Baptists in New Jersey," makes this interesting statement relative to the Cohansey Baptist Church, "When in 1683, the first Baptists came from Clouketin, Tipperary County, Ireland, they settled on the south side of the river, and built a meeting-house on the farm of David Thomas (a Welsh name)."

The third church was established at Piscataway in 1689. It is stated that the Baptists preached in the Town House there in 1685. The people who formed the church came from the region of the Piscataway River, dividing the provinces of Maine and New Hampshire. These sturdy men and women brought their New England name and gave it to a section of New Jersey. Since "at home" they had belonged to Baptist churches they founded the Piscataway Baptist Church. This in turn became the mother of the Scotch Plains Church, and through her became the grandmother of the Newark and New York City churches.

Thus we see that the three sowings in New Jersey of the Baptist idea were made by the hardy stock that settled the countryside of our State. The polity of the Baptists readily explains the lack of connection between the flocks, and the independence of the movements.

The first president of what is now "Brown University," the first college founded by the Baptists in America, was James Manning (1738-91), a member of the Scotch Plains Baptist Church, educated at Hopewell and at Princeton. From the latter he graduated after four years with the highest honors of his class.

Out of these small and scattered beginnings has grown a body of 261 churches with a membership of 69,592, who function through the New Jersey Baptist Convention, organized

in 1830. The convention office is at Newark. The 42,000 Negro Baptists in the State have a convention through which their churches unite for missionary service.

Methodist Episcopal Church

The Methodist movement in New Jersey had its beginnings in the work of Captain Thomas Webb, of the English army, who preached in the market place and the Court House of Burlington in 1770. The first "class" or group of Methodists who gathered for worship and mutual help was formed there December 14, 1770.

The first organized Methodist Society was formed at Trenton in 1771. It had 19 members In 1773 this Society erected a small frame house for worship, the first Methodist Church to be built in this State.

New Jersey Methodism gained impetus through the work of Bishop Francis Asbury, who traveled for many years throughout the eastern part of the state, preaching and forming Societies. We find him at Burlington in 1771, at Greenwich, at Haddonfield, at Mantua and other places, all of which profited by his spiritual power and organizing ability. At the Conference held in Philadelphia in 1773, New Jersey reported two hundred members.

The Church at New Mills, now Pemberton, was third in order of erection. One of the trustees was Daniel Heisler, great-grandfather of John Fort, one-time Governor of New Jersey.

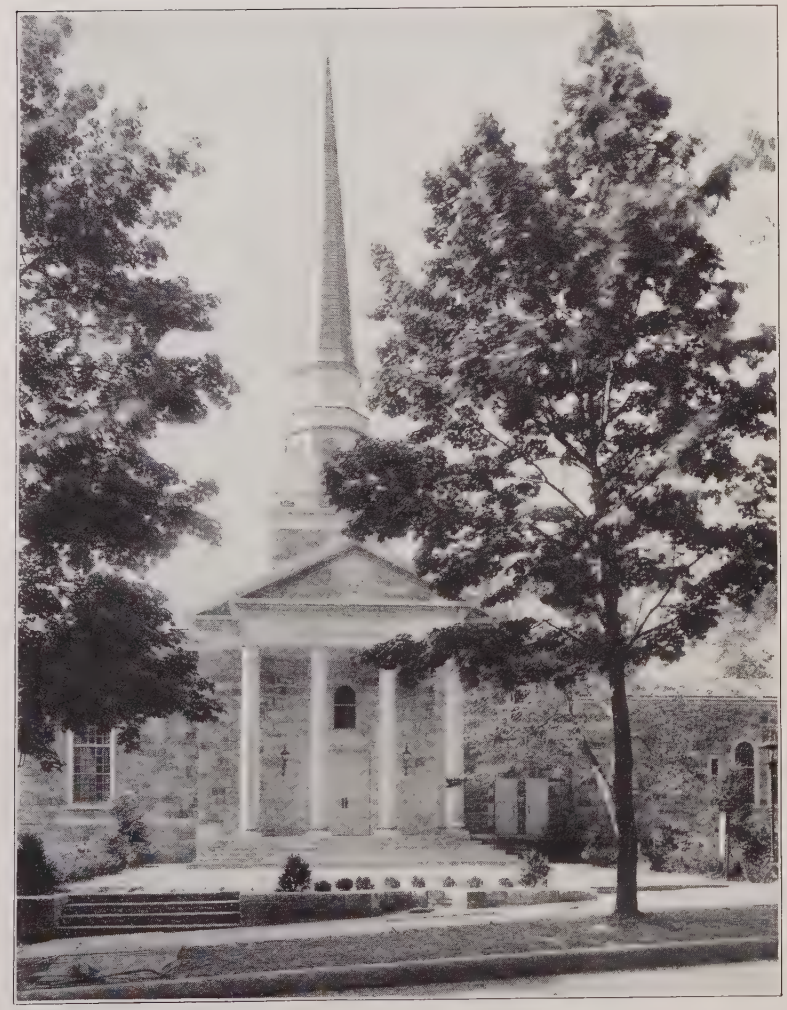
Methodism suffered during the Revolution, but with the coming of peace it began an advance that has continued without serious interruption until the present time. An interesting feature of its progress has been its camp-meetings. By 1819 they were very common. In 1829 four camp-meetings were held on a single circuit during one summer and fall, until the church authorities intervened. Many of them are still annual affairs. The Forkbridge Camp Meeting ran from 1820 till 1835. Those at Newfield, South Seaville and Mount Tabor have been running for many years. Most noted is that at Ocean Grove, founded and chartered in 1869, now grown to a flourishing permanent community, featuring each summer a series of religious meetings of great interest.

UNION CONGREGATIONAL CHURCH, UPPER MONTCLAIR

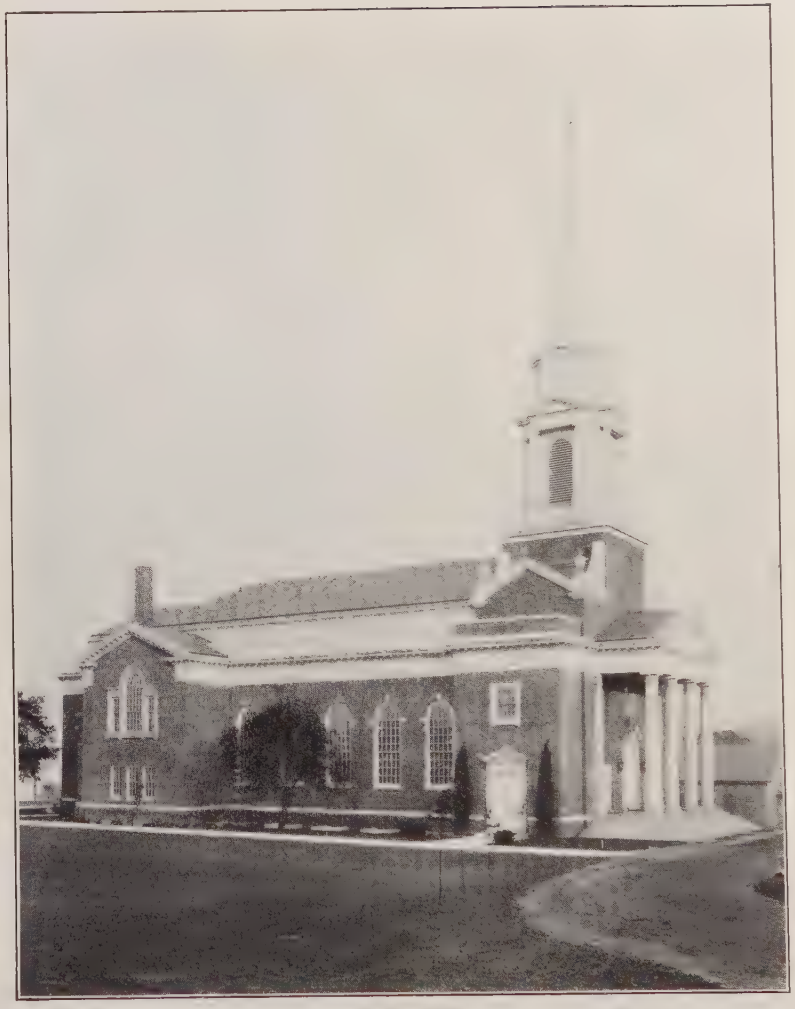
UNIVERSITY CHAPEL AT PRINCETON

Erected 1928. Seats 2,000. Generous donations of alumni and friends of the University provided the means for its erection. Replaced Marquand Chapel, destroyed by fire in May, 1920.

BEAUTIFUL BUT CONTRASTING MODELS OF COLONIAL ARCHITECTURE



FIRST CHURCH OF CHRIST, SCIENTIST, MONTCLAIR



ELIZABETH RODMAN VOORHEES MEMORIAL CHAPEL
New Jersey College for Women, New Brunswick

SOUTH MOUNTAIN RESERVATION, ESSEX COUNTY PARK

Educational institutions of Methodism in New Jersey include Bordentown Military Institute and Pennington Seminary, both schools for boys, and Centenary Collegiate Institute at Hackettstown, for girls, all of these being of secondary grade. Drew University, founded in 1867 as Drew Theological Seminary, has trained nearly 3500 ministers for home and foreign service, and now offers work in religion, theology and the liberal arts.

For administrative purposes, the Methodist Episcopal Church is divided into conferences, one of which, the New Jersey Conference of the Philadelphia Area, under the presidency of Bishop Ernest G. Richardson, is entirely within the State. Another, the Newark Conference of the New York Area, under the presidency of Bishop Francis J. McConnell, comprises north and west New Jersey, with some churches in New York and Pennsylvania. The conferences are divided into districts under the supervision of district superintendents, each conference having four.

There are in New Jersey 630 Methodist ministers and 149,413 church members. Property totalling $25,142,000 is held by the Trustees of the two Conferences.

Reformed Church

The Reformed Church in America, which has had and holds a large place in the growth and development of New Jersey, can be traced back to the movement in Switzerland under the leadership of Zwingle about 1516. It was introduced in Holland as early as 1523, and fully organized by Calvin, a refugee from France, in 1536. It has been styled the "grandmother of the Presbyterian Church." Its faith is based on The Word of God and finds expression in The Heidelberg Catechism and "The Westminster Confession of Faith."

In France it attained such vigor that by 1599 a General Synod was formed at Paris and its churches numbered over 2000, but these were decimated by religious wars. Some half million of those persecuted for their belief scattered all over Europe. Many of them came to America at a later date.

The fierce struggle of The United Netherlands with Philip II of Spain resulted in the peace of Westphalia in 1648 and confirmed the rights and liberties of The Reformed (Dutch) Church which, at a later date in American history, furnished from its polity, a representative form of government.

Emigrants from Holland, under the auspices of the West India Company and the Classis of Amsterdam, began work in New Jersey. After many years of missionary effort the first church was established at Bergen (Jersey City) in 1660. Then followed a church at Hackensack, in 1686, Aquackanonck (Passaic) in 1693; Raritan in 1699, Paramus in 1725, Totowa (Paterson) in 1755, and Millstone in 1766.

Today there are 168 churches divided into eight classes under The Particular Synod of New Brunswick. There are about 45,000 members representing some 20,000 families. There are more than 170 Bible Schools. Queens College, now a part of Rutgers University, also the Theological Seminary at New Brunswick, are fruits of the educational work of The Reformed Church. The highest court of this church, known as the General Synod, assembles once a year and when meeting in the East gathers at Asbury Park, where it has erected a synodical church.

Lutheran Church

Like other denominations the German Lutheran Church reached New Jersey by way of Philadelphia and New York.

A number of Germans set sail for the latter in 1707 but unfavorable winds carried them to Delaware Bay, from whence they decided to put in at Philadelphia. Still heading for New York they kept on across New Jersey, but the rich valleys of the Musconetcong and the Passaic induced them to cut short their overland journey and tarry there.

In these valleys they built their homes, worshipping at first therein and later gathering in buildings better adapted for community assemblages. They settled Long Valley, in Morris County, and gave it the name of German Valley which it retained for years. From here they spread to Somerset, Bergen and Essex Counties. In Bergen County they came in contact with Holland Lutherans. According to the historian Albert Faust and the records of the First Lu-

FIRST CONGREGATIONAL CHURCH, MONTCLAIR
Most beautiful Congregational church in America

FIRST METHODIST CHURCH, CAMDEN
Largest Methodist edifice in southern part of state

theran Church in New York City, the first Lutheran settlement in New Jersey was founded in 1710 in the vicinity of Hackensack. The first German Lutheran church in the State was dedicated in 1731. The parish of Rev. Justus Falckner, who began his ministry in New York City in 1703, extended all the way up the Hudson Valley to Albany and over the northern portion of New Jersey as far west as the Raritan River in Hunterdon County.

The Religious Society of Friends in New Jersey

The first Friends in New Jersey appear to have settled along the Raritan River in 1664, and in 1670 "a meeting was settled at Shrewsbury." Then in 1675 John Fenwicke, with a company of Friends, landed on the shores of Delaware Bay at a place they named Salem. In 1677, 230 Friends emigrated in a body on the ship Trent and founded Burlington. Others followed and by 1681, 1,400 had come to the province. The first meetings were held under a tent made of sail-cloth; then in private houses until a meeting-house was built and a "monthly meeting" was set up July 15, 1678. "At the next meeting it was agreed that a collection be made once a month for the relief of the poor and such other necessary uses as may occur." "On the 4th of the 7th month 1679 it was desired that Friends would consider the matter as touching the selling of rum to the Indians if it be lawful at all for Friends professing truth to be concerned in it."

The first Epistle from an American meeting to the Yearly Meeting in London was sent by Burlington Friends in 1681. Burlington Quarterly Meeting appears to have been set up in 1680 and in May 1681 it was concluded to establish a Yearly Meeting to be held in August following. This meeting was held annually until 1686, after which for a number of years it was held alternately at Burlington and Philadelphia.

The founder of the Society of Friends was George Fox, born at Fenny Drayton, Leicestershire, July, 1624. William Penn once said that Fox had "an extraordinary gift in opening the Scriptures, but above all he excelled in prayer." In 1672 George Fox and his companions visited the Friends at Shrewsbury and Middletown in New Jersey.

William Penn and his co-proprietors issued a statement of their views in regard to the government of the Province of West Jersey which was in part: "Thus we lay a foundation for after ages to understand their liberty as men and Christians, that they may not be brought into bondage but by their own consent; for we put the power in the people. . . . No person to be called in question or molested for his conscience or for worshipping according to his conscience."

The interest of Friends in education developed early as schools were set up in many places in New Jersey long before any other school system appeared in the State. These schools were not only for Friends but for anyone wishing to take advantage of them. Many of these schools are still in operation.

Today there are about 3,500 Friends, or Quakers, in the State and the Yearly Meeting is at Philadelphia. Many of the old meeting-houses are used only once a year but they are kept in perfect repair and several are historical land-marks.

Christian Science Church

As a religion, studied and practiced by individuals, Christian Science began to be known in New Jersey during the decade 1880–1890. As a denomination, represented by congregations, this religion in New Jersey dates from the next decade. The first congregation began to hold informal meetings at Long Branch in 1893. First Church of Christ, Scientist, of Jersey City, formed in 1896, was the first Christian Science church in the State to be formally organized as such. In the next few years, it was followed by churches at Newark, Orange, Cranford, Englewood, and Camden. Now there are in the State 58 Churches of Christ, Scientist, and Christian Science societies, besides a considerable number of groups not yet formally organized.

Each church and society conducts a Sunday School for children up to the age of 20, each maintains a Reading Room, usually in a business district, and each provides annually at least one public lecture on Christian Science.

FIRST BAPTIST CHURCH, MERCHANTVILLE

In several of the cities and villages beautiful churches have been erected embracing various types of architecture. The edifice in Orange is of Norman architecture. That in Maplewood, Old English; Montclair, pure Colonial; Cranford, conventional; East Orange, a type of ancient architecture; and Paterson, old colonial meeting-house type. The Montclair church is one of the most charming in America and in plan and conveniences it is unique among houses of worship.

Religious Life of the Jews of New Jersey

The Jews of New Jersey number approximately 350,000, according to the estimate of the Jewish Publication Society of America. They are distributed throughout the State, with the largest groupings in Newark, Jersey City, Paterson, and Trenton. In every community of Jews the religious activities form their chief concern. In response to the most ancient and imperative call of duty, the Jewish groups, often the smallest, build sanctuaries and schools as soon as they settle in a place.

In the oldest Jewish communities, such as Newark, Paterson and Trenton, there are many synagogues and religious schools—among them being some of the largest and finest in the United States. While there are traces of Jewish life in New Jersey in earlier times, the first organized religious institutions appear in Newark and Paterson, Congregation B'nai Jeshurun at Newark being the name given to the two oldest Synagogues in New Jersey founded about 1848.

The religious life of the Jewish people in towns too small to support a synagogue finds expression in the home life, where the ceremonials connected with Sabbath and Holy Day observance and symbols of the faith are held sacred by the faithful. Not infrequently, Jewish people in small towns are affiliated with the larger synagogues in neighboring cities, especially for the high Holy Days.

The Jewish people are divided into three religious groups known as Orthodox, Con-

servative and Reform, organized on the basis of differences in the ceremonial institutions and the traditional beliefs which are cherished by them. But the differences are not so fundamental as to prevent unity of thought, solidarity of religious aims and harmony of action in all things that concern the preservation of the Jewish heritage.

The education of Jewish youth in religious matters has always been regarded as a primary duty. The synagogues, the Jewish homes, the Jewish social centers and special Jewish schools regard Jewish education as the paramount need of the present day.

Roman Catholic Church

Like the mustard seed in the Gospel parable the Catholic Church in New Jersey developed from especially humble beginnings. Marbois, writing from Philadelphia, March 25, 1785, gave the number of Catholics in New York and New Jersey as only 1700. More than half of these were probably in New Jersey.

As early as 1672 there were Catholics at Woodbridge and at Elizabethtown, whose spiritual needs were looked after by the Catholic Chaplains of Governor Dongan of New York, Fathers Harvey and Gage. Some of these pioneer Catholics were Alsatians, engaged in the salt-making industry.

In the Eighteenth Century Fathers Robert Harding and Ferdinand Farmer (Steinmeyer) made fatiguing tours across the State ministering to the scattered groups of Catholics at Mt. Hope, Macopin, Basking Ridge, Trenton, Ringwood and other places. Some time before the Revolution German Catholics settled at Macopin, near Echo Lake, and some of their descendants compose the Catholic parish there to-day. French refugees from the West Indies settled around Princeton and in the neighborhood of Elizabeth early in the Nineteenth Century.

The first parish in the State was established at Trenton in 1814, St. John's, the first church built in Newark, was opened in 1828, the Pastor being the Rev. Gregory B. Pardow, of New York. The first native of Newark ordained to the Priesthood was Rev. Daniel G. Durning, son of Charles Durning, in whose house Mass was celebrated before St. John's was erected.

TEMPLE B'NAI ABRAHAM, NEWARK

CHURCH OF THE BLESSED SACRAMENT AND SISTERS' HOME, NEWARK

In 1820 Father Richard Bulger erected the first Church in Paterson. In 1825 the first Mass was said in New Brunswick by Rev. Dr. Power, of New York, and on December 19, 1831, the first church was opened there by Rev. Joseph A. Schneller. In 1830, the first Mass was said in Jersey City (Paulus Hook) and in 1837 the first church was opened there by Rev. Hugh Mohan.

Rev. Ferdinand Farmer is considered the pioneer Catholic missionary of New Jersey. He arrived in Philadelphia in 1758. It was his custom every Spring and Autumn to journey along the Delaware River, cross country through Hunterdon County, Somerset County, Morris and Sussex Counties, visiting Geigers, Charlottenburg, Mt. Hope, Macopin, Basking Ridge, Long Pond, Trenton and Salem.

About 1848 many Irish Catholics came to New Jersey. Rt. Rev. Bernard J. McQuade, later Bishop of Rochester, began his missionary career in New Jersey. He became pastor at Madison in 1848 and had missions at Morristown, Dover, Mendham, Basking Ridge and Springfield. His first parish in New Jersey extended from Madison to the Delaware. He opened the first Catholic School in New Jersey at Madison, built the Church of the Assumption at Morristown, St. Joseph's at Mendham and St. Rose's at Springfield, now removed to Short Hills. He became rector of St. Patrick's pro-cathedral at Newark in 1853 upon arrival of the Bulls from Rome appointing James Roosevelt Bayley, first Bishop of Newark. He built Seton Hall College, was its first President, and brought the Sisters of Charity into the Diocese of Newark. When the Rt. Rev. James Roosevelt Bayley was consecrated first Bishop of the Diocese of Newark, which then comprised the whole of New Jersey, there were only 50,000 to 60,000 Catholics, 25 priests and no Diocesan Institutions in the State.

In 1856 Seton Hall College was opened. In 10 years the churches increased to 67 and the priests to 63. Bishop Bayley was promoted to the Archiepiscopal See of Baltimore, July 30, 1872, and his successor, Bishop Michael Augustine Corrigan, was consecrated May 4, 1873. On October 1, 1880 Bishop Corrigan was made Co-adjutor to the Archbishop of New York and Rev. Dr. Winand M. Wigger was chosen

to succeed him as the third Bishop of Newark, October 18, 1881 In July 1881, the Diocese was divided by the creation of the Diocese of Trenton, which comprises the 14 southern counties of the State, leaving in the Diocese of Newark the seven northern counties.

On July 11, 1899 Bishop Wigger laid the corner stone of the New Cathedral of the Sacred Heart on Clifton Avenue, Newark. Rt. Rev. John J. O'Connor succeeded him and became the fourth Bishop of Newark. He was consecrated July 25, 1901.

In 50 years there has been an increase of tenfold in the number of churches and ninefold in the Catholic population, with 50,000 children attending 167 Catholic schools and institutions, and 396 priests attending 416 churches and chapels. Bishop O'Connor died May 20, 1927 and the See of Newark remained vacant until the installation of Rt. Rev. Thomas J. Walsh, May 1, 1928, as the fifth Bishop of Newark. While the See of Newark remained vacant the Diocese was administered by Rt. Rev. Monsignor John A. Duffy, D.D., who had been Vicar General under Bishop O'Connor, and whom Bishop Walsh appointed as his Vicar General.

The first Bishop of the Diocese of Trenton was Rt. Rev. Michael J. O'Farrell, who was consecrated November 1, 1881. He was succeeded by Bishop James A. McFaul, who was consecrated October 18, 1894. Bishop McFaul was succeeded by Rt. Rev. Thomas J. Walsh, consecrated July 25, 1918, and transferred in 1928 to the See of Newark, being succeeded in the Trenton See by Rt. Rev. John J. McMahon, D.D., as the fourth Bishop of that Diocese.

In 1928, which marked the 100th Anniversary of the opening of the first Catholic Church in Newark, there were in the Newark Diocese under Rt. Rev. Thomas Joseph Walsh, D.D. as Bishop, 712 priests, 412 churches and chapels, 14 orphan asylums, four Homes for the Aged, 12 hospitals, 4,640 boys and girls in private Catholic high schools and colleges, 2,670 boys and girls in 60 parochial high schools, 82,663 pupils in 150 parochial schools and a Catholic population of 704,785.

CATHEDRAL OF THE SACRED HEART, NEWARK
Situated on High Ground. A Striking Landmark

In the Diocese of Trenton there were 247 priests, 240 churches and chapels, 3,364 students in Catholic high schools, 36,224 pupils in 89 parochial schools, two hospitals, two Homes for the Aged and a Catholic population of 230,242.

In the Ukrainian Catholic Diocese of the district there were 21 priests of the Greek rite and 34 churches with 60,000 Catholics of the Oriental rite. To these must be added the Uniats. All told the Catholic population is about a million.

GLIMPSE OF A LUXURIANT GARDEN IN MONTCLAIR
(Photographed for this book by special permission of the owner)

Chapter IV

Education

PUBLIC SCHOOLS

The public schools of New Jersey are the pride of the people. Education very early received much attention, and the keen interest in its development laid the foundation for the present public school system. The social and economic life of the State have exercised an important influence on its growth. Local initiative and the establishment of local school systems under trained public education officials, coupled with a highly organized plan of State control, have facilitated the general adoption of progressive policies.

Vocational schools, adult education, continuation schools, provisions for retarded and crippled children, and for physical and health training are samples of what the State has undertaken. But aside from the development which appears in the structure of the system, the courses of study are modern, and teaching is of a high order. Few states in the Union have to an equal degree recognized teaching as a profession.

The study on education published by Dr. Leonard Ayres in 1920 ranked New Jersey as the fourth State. The investigation indicated that New Jersey had made notable progress and had risen steadily in its relative progress as measured by an exacting index of efficiency. It was the only State in the Eastern Division that had gained in rank in the 30 years preceding 1920. Using the same index as a basis for classification in 1924, New Jersey ranked fourth. Of those States east of the Mississippi River, it preceded all except New York, which occupied third place.

The public schools provided by the respective communities received their first recognition by the Legislature in 1817, when provision was made for a State school fund. In 1846 the position of State Superintendent of Schools was created. In 1867 a requirement was inserted in the State Constitution that "the Legislature shall provide for the maintenance and support of a thorough and efficient system of free public schools for the instruction of all the children in the State between the ages of 5 and 18 years."

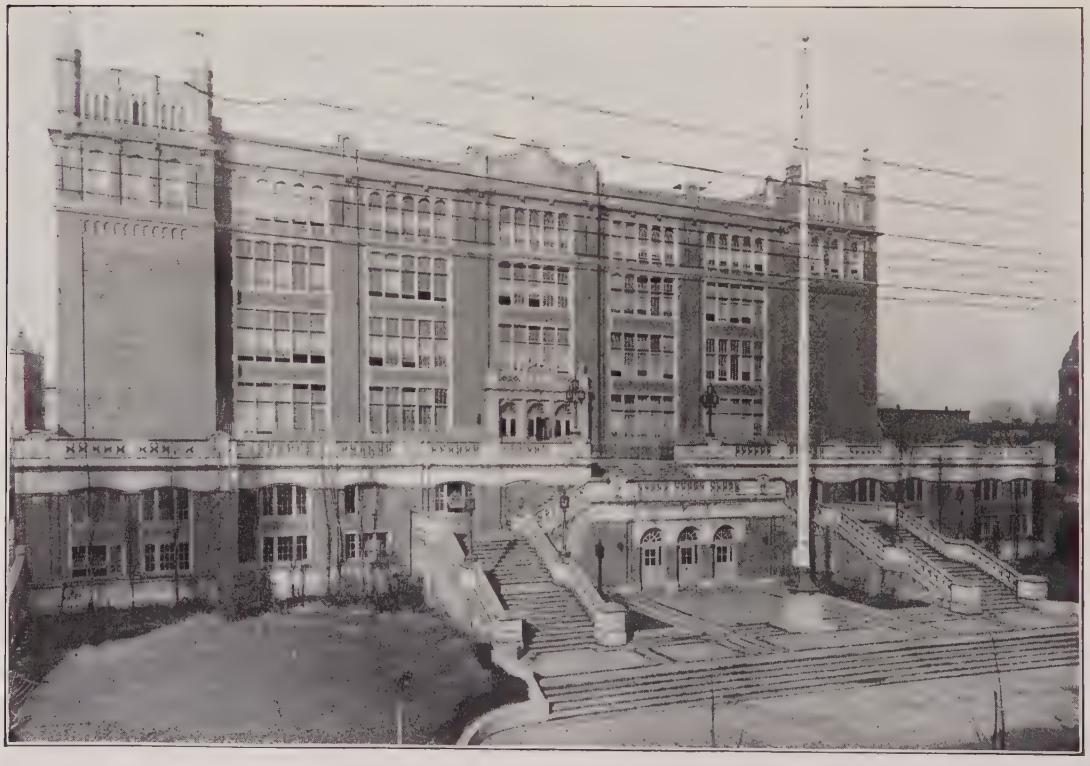
The whole system of education was remodeled and placed on a better basis. Provision was made for a State Board of Education, of ten members appointed by the Governor, each for a term of eight years; a Commissioner of Education, appointed by the Governor with the approval of the Senate, for a term of five years; the maintenance of the Normal School and a Model Training School; and for a State Board of Examiners to examine and license teachers.

The local district, or community, schools continued until 1874, when the district schools of the city were combined into a city school district. In 1894 the school districts outside of the cities were made co-extensive with the municipalities in which they were located. These changes were made by acts of the Legislature and they reduced the number of school districts from about 1500 to 400.

The Commissioner of Education, with the approval of the State Board of Education, appoints five assistant commissioners, each in charge of a supervisory division; a County Superintendent of Schools for each of the 21 counties of the State; a director of teacher training; normal school principals; instructors; and other positions covered by statute.

For more than a half-century New Jersey has had a compulsory education law. All children between 7 and 16 must attend a day school, or obtain equivalent instruction elsewhere, except

STATE NORMAL SCHOOL AT GLASSBORO



CENTRAL COMMERCIAL AND MANUAL TRAINING HIGH SCHOOL, NEWARK
An "All-Year" School. A national authority on vocational education declares, "there is none better."

those between 14 and 16 who hold employment certificates.

New Jersey is conscious of her rural school problem, and this phase of educational work has been well developed. Since 1916 highly trained and experienced teachers designated as "helping teachers" have been employed for the supervision of instruction in the rural schools. There are now 40 helping teachers giving full time to this rural-school work. The statutes provide for the transportation of children living remote from school buildings, and for a reimbursement of three-fourths of the cost of such transportation when approved by the County Superintendent of Schools. This provision has been a great aid to rural districts in providing high-school facilities in neighboring districts and for the consolidation of the small rural schools.

About 10 years ago in Burlington County there were 56 one-room schools. After an intensive campaign for consolidated schools, and with the aid of the transportation subsidy, there is to-day only one one-room school, and this building is soon to be abandoned. There are still many one-room schools in the State, some of which it does not seem practical to include in a consolidation scheme, but the enlargement of the school unit and the elimination of the smaller one-room type of building continues to be the objective in all places where transportation is feasible.

The first normal school for the training of teachers was established in Trenton in 1855. There are now additional State normal schools at Newark, Glassboro, and Paterson, and a Teachers' College at Montclair. A new normal school is being erected at Jersey City. Since 1913 State summer schools have been conducted for the training of beginning teachers and the improvement of teachers in service.

In 1881 an act was passed by the Legislature to encourage the establishment of schools for industrial education. In 1888 the various school districts were authorized by law to establish courses in manual training. Under this law the districts are reimbursed out of State funds to the extent of one-half of the initial cost of establishing the course and one-half of the yearly maintenance cost, provided such State aid to a district shall not exceed in any one year the sum of $5,000.

A similar provision was made for district vocational schools in 1913, with the proviso that the contribution by the State for any such school shall not exceed in any one year the sum of $10,000. The same statute provides for county vocational schools, and many of the school districts and several counties are now conducting excellent vocational schools.

For the past 25 years school districts have been required to engage physicians as medical inspectors to ascertain physical defects in pupils and to advise the teachers relative to contagious diseases. In 1917 a law was passed requiring that physical training be taught in all of the public schools in the State. The law requires that two and one-half hours per week be devoted to the physical training program, which includes instruction in hygiene and related subjects.

The health of school children is receiving more attention every year. A large percentage of the districts have school nurses, and many districts employ school dentists. Most of the high schools are equipped with cafeterias and gymnasiums. The water supply of all school buildings is inspected by the State Department of Health at least once each year. The school officials are generally interested in provisions for the prevention of disease and promotion of the health of all the children.

Special facilities are prescribed for the crippled, blind, deaf, and subnormal children and for foreign-born and native adults. Continuation schools are also provided for employed pupils holding age and schooling certificates.

There are approximately 750,000 pupils enrolled in the public schools of the State, more than 50,000 of whom are transported at public expense. Nearly 26,000 teachers are employed in the 2,287 school buildings, which have an approximate value of $241,000,000.

The New Jersey Legislature of 1928 provided for a survey of public education by a special commission, which is now going into all questions affecting the efficiency and administration of our present school system, with particular reference to present costs and future requirements.

ST. CECILIA'S HIGH SCHOOL, ENGLEWOOD

ST. MARY'S HALL, BURLINGTON—EPISCOPAL SCHOOL FOR GIRLS

HIGHER EDUCATION

Princeton University

It was an enthusiastic Oxford don who said that Princeton is a jewel in an emerald setting. Airplane pictures reveal whatever justification underlies the bit of flattery, but the fact remains that Princeton is a typical university town, set on a ridge halfway between New York and Philadelphia, and, lifting above the surrounding girdle of green fields and woodland, its towers dominate the view one gets both from the air and from the distant railroad.

Its setting in the country has had much to do with the University's traditions and development. Founded by royal charter in 1746 at Elizabeth, removed in 1747 to Newark and to Princeton in 1756, in which year were completed the first college buildings, Nassau Hall and the President's house, it is now the oldest and also the largest university in the United States situated in a village. Location as well as tradition also led to the decision in 1896, at the sesquicentennial of the founding, that the University's future lay not in developing large professional schools but in devoting itself primarily to higher liberal education or, phrasing it differently, to those liberal aspects of the arts and sciences which support and broaden all professional and technical training—in other words, developing along the lines of the original medieval *studium generale*, or university.

With the exception, therefore, of the School of Engineering and the School of Architecture, Princeton maintains no technical departments; and both of these exceptions are so definitely humanistic in purpose and method that they contrast sharply with the usual technical schools in those subjects. Similarly, the Princeton Graduate School carries students on to higher degrees in preparation for teaching and other professions, or for public service, or for the pure research that lies at the heart of modern humanitarianism as well as of modern industry. Utilitarian and commercial ends are of secondary importance in such a programme.

Other characteristics of Princeton have inevitably developed from these fundamentals. One for example, dating from the time when Nassau Hall was dormitory, refectory, chapel, recitation hall and library all in one, is the stamp of the communal dormitory life that marks the daily existence of the place.

On the central, older portion of the 900-acre campus are grouped 21 dormitories, mostly in quadrangles and courts of English collegiate Gothic, a style Princeton frankly borrowed from England and introduced into American university architecture in 1896. A large proportion of the undergraduate body is thus already housed on the campus and it is the ultimate plan to erect enough dormitories to hold virtually all the undergraduates. The residential idea was the basic principle of the Princeton Graduate College, which at the time of its erection was unique in America not only in affording graduate students adequate living quarters, but also in giving them a common scholarly life and the beneficent spur of daily democratic contact with one another and with the University as a whole.

This dominant characteristic had no small influence in instituting the Honor System in 1893, now one of Princeton's most treasured traditions. An honor system can be adequately maintained only where students live together in the same atmosphere and under identical influences. The fact that Princeton has no non-resident or commuting students provides a solidarity and intimacy which have enabled student self-government to reach a high plane.

The Honor System is administered solely by the undergraduates; they also share in the administration of university discipline, and of university athletic and non-athletic organizations; and the Student Council, with general oversight of campus life, is composed of representatives of the four college classes.

One of the obvious essentials of the Princeton plan is that not more students should be admitted than can be properly housed, boarded and taught. The University therefore was the first frankly to limit its enrollment by these con-

PYNE LIBRARY, PRINCETON UNIVERSITY
Gift of Mrs. Percy Rivington Pyne. Contains main library, reading rooms and 17 seminary rooms for advanced study

CUYLER DORMITORY, PRINCETON UNIVERSITY
One of 21 dormitories, mostly in quadrangles and courts of English collegiate Gothic

siderations. Its freshman class is set at approximately 600 or about 2000 for the entire undergraduate body, and its graduate school to 250.

Situated on the old "King's Highway" of colonial days, the town and campus are full of historic memories. Even before the Revolutionary War the college was known as a center of the new Americanism that culminated in that struggle. The decisive Battle of Princeton was ended on college grounds; Nassau Hall was occupied by British and American troops in turn; here Congress sat at the close of the war; here audience was given to the first foreign minister accredited to the United States; and here Washington received the thanks of the nation for his services.

In Nassau Hall too, the first Legislature of New Jersey sat, the first governor of New Jersey was inaugurated, and the Great Seal of the State was adopted. These events have given a quality to Princeton tradition which has had its effect on the character of the University. Two presidents of the United States have been among its graduates and a third was one of its trustees and a devoted supporter. Two vice presidents and one chief justice of the United States have been Princeton alumni, and Princeton names are plentiful in the annals of American diplomacy, government, politics, education, letters, science, theology and law.

A significant illustration of the University's service to the State is the large proportion of its graduates who have occupied positions of highest legal authority in New Jersey. Since 1776 Princeton has awarded diplomas to 15 of the 27 attorney generals of the State, 11 of the 16 chief justices of the New Jersey Supreme Court, and 19 of the 27 chancellors of the State.

A less familiar illustration of Princeton's quiet service to the nation may be found in the story of her work in science dating from the beginning of the Nineteenth Century through Hosack, Torrey, Guyot, and Joseph Henry up to the present generation of Princeton scientists whose work in research has recently received generous endowment from the General Education Board.

The undergraduate courses offered at Princeton lead to the degree of A.B., B.S. and B.S. in Engineering, while the higher degrees obtainable in the Graduate School are those of A.M., M.F.A., and Ph.D. and the advanced engineering degrees.

The University has an extensive system of scholarships and loan funds for undergraduates in need of financial aid to pay their way through college. Its bureau of personnel also provides remunerative employment for such students. In the year 1927–28 between 450 and 500 men were helped in this manner; scholarships and loans were granted to them amounting to roughly $175,000; and they earned in addition over $200,000.

The health of the student body at Princeton receives most careful attention. A new and thoroughly modern Infirmary is maintained with competent staff for dispensary and other service. Athletics, both intramural and intercollegiate, are given prominence in the Princeton scheme of things, and the athletic equipment is extensive including stadium, boathouse, skating rink, tennis courts, gymnasium, swimming pool, and several athletic fields for baseball, football, soccer, lacrosse and polo. The Field Artillery Unit has a barracks and riding hall.

While supervised exercise is required of all freshmen, and other students are constantly urged to take advantage of Princeton's outdoor facilities, those who are less athletically inclined have the choice of some 40 non-athletic organizations,—musical, literary, scientific, dramatic and social. It is, therefore, a rare individual who cannot find some extra-curricular interest to occupy his leisure hours—when he has any.

For the modern undergraduate undoubtedly has less leisure than his father had at college. If he is a normal lad he has more interests to begin with. Under the Princeton preceptorial method and the broadened curriculum, together with the new freedom of the "four-course" plan for upper classmen, he has far more liberty than his father had in the choice and performance of his work. But this in its turn lays on him a proportionately greater personal responsibility. Nevertheless the Princeton undergraduate, like his fellows elsewhere, does not appear to suffer from overwork and he seems to find the place a pleasant one to live in.

The University is absolutely non-sectarian by charter and stands solely on the broad basis of Christian liberalism. This attitude is illustrated not only by the work of its Philadelphian Society but also in the new University Chapel, which was dedicated to the worship of God on Memorial Day 1928. Without thought of denominational or other restrictions, it was erected and is being completed by numberless gifts in memory of Princeton men and Princeton friends who served well their day and generation.

The Catalogue for 1927–28 showed 2488 students from 48 states and 20 foreign countries; 19 states had each more than 20 students enrolled, and 28 had more than 10. A residential community of such variety necessarily has a democratizing and broadening influence on its members. The elusive spirit of the place is impossible to describe. It is safe to say that it is not to be found in any single trait or organization, but rather in a certain unity of feeling and action.

Naturally, as President Woodrow Wilson long ago pointed out, alumni never feel their connection with the place and its life is entirely ended. Yet they return again and again to renew old associations, and through organized alumni channels they are consulted at every critical turn. "Princeton lives and grows," continued Mr. Wilson, "by comradeship and community of thought; that constitutes its charm; binds the spirit of its sons to it with a devotion at once ideal and touched with passion; takes hold of the imagination even of the casual visitor if he have the good fortune to see a little way beneath the surface; it is the genius of the place."

Rutgers University

Rutgers University, the State University of New Jersey, was chartered as Queens College November 10, 1766, by William Franklin, Governor of the Province of New Jersey and by the authority of George III of England. It was the eighth college founded in the American colonies and had its origin in the zeal for education and religion shown by the Dutch colonists in New York and New Jersey. The college was opened for instruction at New Brunswick in

PORTION OF CAMPUS AND BUILDINGS, SETON HALL COLLEGE, SOUTH ORANGE

AERIAL VIEW, BUILDINGS AND ATHLETIC FIELD, STEVENS INSTITUTE OF TECHNOLOGY

1771, and in 1774 it graduated its first student, Matthew Leydt, with the degree of bachelor of arts.

In 1825 its name was changed to Rutgers College in recognition of the benevolence of Col. Henry Rutgers, of New York City. In 1864 Rutgers was made the Land-Grant College of New Jersey, and a year later courses in agriculture, engineering, and chemistry were offered. In 1880 the New Jersey Agricultural Experiment Station was established at the college farm, and in 1887 the College Agricultural Experiment Station was founded. In 1902 a department of ceramics was created by the State.

In 1917 Rutgers was designated the State University of New Jersey, and in 1924 Rutgers University was adopted as the name of the institution, its separate colleges, and departments. In 1925 a division of university extension was established, and in February, 1927, the trustees took over the New Jersey College of Pharmacy. The university is composed of six colleges and schools, each directed by its dean, under the supervision of the president and the board of trustees.

The College of Arts and Sciences offers courses in liberal arts, economics, business administration, journalism, chemistry, and biology, in addition to pre-medical, pre-law, and pre-theological courses.

The College of Engineering, established April 4, 1864, trains men for the profession of engineering.

The College of Agriculture is at the college farm of 750 acres. It offers curricula in general agriculture, dairy husbandry, dairy manufactures, pomology, vegetable growing, poultry husbandry, landscape gardening, floriculture, and economic entomology. In the winter of each year the college offers six courses of 12 weeks in general agriculture, dairy farming, dairy manufactures, fruit growing, vegetable gardening, and poultry husbandry.

The School of Education, established October 12, 1923, organizes and administers the university program for the training of teachers.

The New Jersey College for Women was established April 12, 1918. It is adjacent to the College of Agriculture. Two courses of undergraduate instruction are offered, the liberal arts course and the practical arts or home economics course. The degrees of A. B., Litt.B., and B. Sc. are awarded to students completing the four-year curricula.

The New Jersey College of Pharmacy is in Newark. It was incorporated August 17, 1894, and is a member of the American Association of Colleges of Pharmacy. The course extends over three years, leading to the degree of Ph.G.

The Department of Ceramics offers a four-year course of preparation for places of leadership in the ceramic industry.

The Department of Military Science and Tactics offers two-year courses in basic military training. It is required of all freshmen and sophomores, and in advanced elective courses during junior and senior years. The Corps of Cadets is organized as a battalion of infantry, forming a unit of the Reserve Officers' Training Corps.

Connected with the university are several extension divisions and bureaus, including agriculture and home economics, courses for teachers, the university extension division, the United States Bureau of Mines experiment station, the bureau of economic and business research, and the bureau of biochemical and bacteriological research.

The grounds, buildings, and equipment of the university are valued at more than $7,000,000, and the campus includes over 800 acres. The undergraduate enrollment in 1927–1928 was 2,638, and the total number receiving instruction by the university, including the summer session, the university extension division, the short courses in agriculture and in engineering, and the extension courses for teachers, was 10,313.

Intercollegiate athletics are conducted under the direction of the athletic association, with a graduate manager of athletics. Varsity teams are maintained in football, basketball, swimming, baseball, track, lacrosse, tennis, and cross-country.

A dean of men gives full time to questions of undergraduate discipline, spirit, and morale, and a university chaplain acts as advisor on matters of religion and as executive secretary of the Y. M. C. A.

Approximately 80 per cent of the under-

VALE OF THE RAMAPO, JUST BELOW THE NEW JERSEY–NEW YORK STATE LINE

When the trees and mountains are clad in brilliant October reds and yellows—as they were when this photograph was taken for the New Jersey State Chamber of Commerce—this vista is delightful

graduates are residents of New Jersey, and the extension activities are confined to citizens of the State. During the past five years the average increase in enrollment of resident students has been approximately 20 per cent.

Stevens Institute of Technology

Stevens Institute of Technology at Hoboken is a college of engineering. From its first establishment in 1870 this college has offered consistently one course in the fundamentals of engineering intended to provide basic training for the practice of the profession in its several branches, electrical, civil, or chemical as well as mechanical engineering. It was the first college to grant the degree of Mechanical Engineer and it continues to give only that degree to its graduates.

In its name and by reason of its location on Castle Point above the Hudson River, the Stevens Institute of Technology perpetuates a remarkable tradition of engineering. Colonel John Stevens, who purchased in 1784 the grounds now included in the campus of the college, was an engineer of unusual and prophetic gifts. On his estate at Castle Point he planned the first low-pressure engine constructed on the American continent, installing it in a boat on the Hudson three years before Fulton's *Clermont* took the water.

Here he built the *Phoenix* (1808) which, rounding the New Jersey shore from Hoboken to Philadelphia under the supervision of his son Robert L. Stevens, was the first steamboat to brave the ocean. Here, between Hoboken and New York, he established the first steam ferry in the world. Here also he caused to be constructed and operated on a circular track (1825–1826) the first locomotive in America to run on a track under steam. His sons, Robert L. Stevens and Edwin A. Stevens, founders of the Stevens Institute of Technology, inherited their father's devotion to the development of steam navigation and railroad transportation.

The history of practical railroading in the State of New Jersey begins with the incorporation in 1830 of the Camden and Amboy Railroad, of which one of these brothers was president and chief engineer; the other, treasurer. It was for the Camden and Amboy Railroad that Robert Stevens invented the T-rail and the hook-headed spike, and for it the Stevens brothers imported the historic locomotive "John Bull."

Edwin A. Stevens was not only an engineer but also a pre-eminent master of finance, and he had an important part in laying the foundation for the State's commercial greatness. He also gave to the State one of the first colleges of engineering in the country, for he prescribed by his will that there be established an institution "for the benefit, tuition, and advancement in learning of the youth residing, from time to time, within the State of New Jersey." An act of the legislature consequently incorporated the Trustees of the Stevens Institute of Technology, and the doors of the college were opened in September of 1871 for the admission of students.

As first president of the college was chosen Dr. Henry Morton of Philadelphia who previously had served as secretary of the Franklin Institute of that city. With him in the first faculty were associated Professor Alfred M. Mayer, the leading experimental physicist of his day; Professor R. H. Thurston who later was to establish the course in mechanical engineering for Sibley College of Cornell University; Professor C. W. MacCord, collaborator with Ericsson on the *Monitor;* Professor A. R. Leeds, expert on water supply and sanitary engineering; and Professor DeVolson Wood who was to form the department of civil engineering in the University of Michigan. The prestige given to Stevens by this faculty caused it to be emulated in other states and brought to it additional funds for endowment, among the foremost donors being President Morton himself and Andrew Carnegie.

Dr. Morton was succeeded in 1902 by President Alexander Crombie Humphreys, Stevens '81, who departed from a distinguished career in the illuminating gas industry to direct the affairs of the college. In his quarter century as president (1902–1927) the facilities of the college were still further increased by the acquisition of the Castle Point estate of the Stevens family; by the installation in new laboratories of the departments of chemistry and mechanical

MILITARY PARK AND BROAD STREET, NEWARK
Looking south from the windows of the New Jersey State Chamber of Commerce

AERIAL VIEW OF HOPATCONG—NEW JERSEY'S LARGEST LAKE

engineering; by the extension of athletic fields and the erection of a gymnasium; and by the reconstruction of buildings, erected during the war, to house the department of electrical engineering, the engineering museum, and the library.

Professor Frank L. Sevenoak served during the year 1927–1928 as Acting President of the Institute until the Trustees installed as the third president of the college in 57 years, Dr. Harvey Nathaniel Davis, previously Professor of Mechanical Engineering in Harvard University. The Trustees reaffirmed at this time their purpose "to offer to a restricted number of young men thorough training for the profession of engineering through a single course leading to the degree of Mechanical Engineer," and prescribed that the enrollment of the college should not exceed 500 students. For this purpose the college possesses a plant and equipment valued at $2,000,000 and permanent funds to the amount of $2,750,000.

The campus and grounds of the Institute extend over approximately 30 acres, and offer facilities for education and student life unusual in an area of so great industrial and metropolitan activity as is to be found in northern New Jersey and the neighboring city of New York.

The Stevens Alumni number approximately 3,000, of whom more than one-fifth are residents of New Jersey. The student body in an even greater proportion includes young men of this state. Many of the students are in residence on the campus of the college, either in the dormitory maintained in Castle Stevens or in the nine national and two local fraternities which exist there. The Honor System prevails at Stevens as part of a system of student self-government.

The Stevens Engineering Society brings its members into affiliation with the American Society of Mechanical Engineers and the American Institute of Electrical Engineers. High scholastic standing is recognized by membership in the honorary engineering fraternity, Tau Beta Pi. Basketball, baseball, lacrosse and tennis are the Varsity sports, and the student publications are the LINK (annual), the STUTE (weekly), and the STONE MILL (six issues yearly). The Glee Club and the student dramatic society, Clef and Cue, offer performances annually.

OTHER PROFESSIONAL SCHOOLS

Law Schools

The New Jersey Law School was opened in one of the Prudential buildings at Newark, October 4, 1908. At first, two years were required for completion of the course. In 1912 it was extended to three years. The corporate purpose, as set forth in its State charter, declares that the school is established "to maintain and operate a law school, to establish and maintain a law library, and to publish books." Students are permitted to count 24 months spent in law school as part of the necessary time required in the serving of a three-year clerkship.

In December 1908 the property at 33 East Park Street was purchased. In 1909 an addition was built, and in 1916 the property at 35 East Park Street was added. In 1921 a structure of Gothic architecture was erected for the school's law library.

In 1927 the school numbered 2,335 students. Since 1927 one year of college work has been required for admission and two years of college work will be required on and after 1929. Steps have been taken to form a pre-legal college department.

The South Jersey Law School, in Camden, offers a general legal preparatory course. There is also a college department. Practical training is given in office practice, in the preparation of briefs, and in the pleading of cases. Particular attention is given to New Jersey law, and the courses on pleading and practice are designed to promote a knowledge of procedure in the State courts. The school is open to men and women above 18 years of age, who have had two years of college study, or its equivalent. The

ST. ELIZABETH COLLEGE, SANTA RITA HALL DORMITORY

BLAIR ACADEMY, BLAIRSTOWN

ST. ELIZABETH COLLEGE, CHAPEL AND CAMPUS

DREW UNIVERSITY, ADMINISTRATION BUILDING, MADISON

degree of LL.B. is conferred. There are evening sessions.

The Mercer Beasley School of Law, named for Chief Justice Beasley, was incorporated in 1927, and received its charter to confer degrees in December of that year. Two years of college education, or its equivalent, are required for admission. The school has a full three-year course. Its quarters are in the Industrial Office Building, Newark. It has a library of about 3,000 volumes, and conducts both afternoon and evening classes.

College of Engineering and Technical School—Newark

Newark Technical School was founded by the Board of Trade of Newark in 1883, when legislation was secured for joint support from

NEW JERSEY LAW SCHOOL, NEWARK

the City and the State. The school shares the distinction with a similar institution in Toledo, Ohio, of being one of the first two of its type in the United States. As technical education progressed, the school kept pace with it, and a decade ago the College of Engineering was established.

The college has adopted the co-operative method of engineering education. Courses are offered in civil, chemical, mechanical, and electrical engineering, leading to the degree of Bachelor of Science. Electrical, mechanical, or chemical engineering degrees may be obtained after two years of practical experience and acceptance of a thesis.

Pupils are paired,—one working in the shop while the other is taking classroom instruction. Practical shop experience is obtained in the works of a number of the leading industrial plants of Newark, Elizabeth and other places in the vicinity. The enrollment is in excess of 1,300.

FIRE LOOKOUT STATION NEAR CULVER'S LAKE, STOKES STATE FOREST

This 9000-acre tract is available for summer recreation. The forestry division of the Department of Conservation and Development encourages the use of camp sites on this large mountain, lake and forest reservation.

NAVESINK RIVER AT RED BANK
An historical stream now popular for motor-boating

RARITAN BAY FROM THE STATE HIGHWAY BRIDGE AT MORGAN—STATEN ISLAND IN THE DISTANCE

OTHER PRIVATE SCHOOLS

New Jersey has many private schools with long and honorable careers that are known beyond the borders of the State. Some of them are distinguished for their efficiency. Some are of the college grade and others are college preparatory schools. Special mention of a few is possible.

Lawrenceville is unique in its plan and methods. It has the English House system adapted to meet American conditions. Its property comprises a golf links, 30 clay tennis courts, eight baseball and football fields, a quarter-mile cinder track, a pond for skating, and an excellent gymnasium. Every applicant must take entrance examinations, or furnish college entrance board credits, and take mental aptitude tests. The school credits according to the college standards and requires its pupils to pass the entrance board's examination. Classes are restricted to not more than 15 boys.

The first Catholic School for women in the United States, the College of St. Elizabeth, founded in 1899, at Convent Station, in Morris County, had for its background the Academy of St. Elizabeth established 40 years earlier. The latter had its origin in the building in which a "seminary for young ladies" had been opened by Madame Héloïse Chegaray in 1837, on the road from Bottle Hill in Madison to Whippanong.

In 1854, Bishop Bayley purchased the Chegaray place and converted it into a diocesan seminary for young men, known as Seton Hall. When Seton Hall was removed to South Orange in 1860, the Society of the Sisters of Charity of New Jersey, took charge of St. Elizabeth's. In 1878, St. Elizabeth's began to register students from other states, and a new site was sought. The present site, on a mile-wide plateau between Morristown and Madison, was first occupied in 1880.

The courses are,—classical, scientific, and general. A two-year post-graduate course, a department of pedagogy, and a music and art course, supplement the regular courses. St. Elizabeth's was first conducted as a high school but became a Catholic college in 1899. The first building of the college was Xavier Hall completed in 1899. Santa Rita Hall was opened in 1907. The new chapel was dedicated in 1909. The plant experiment house was built in 1912. Santa Maria Hall contains the main library, class-rooms, and laboratories. The newest dormitory was opened in September, 1926.

Seton Hall College at South Orange is conducted by members of the Catholic clergy of the Diocese of Newark. It consists of a college of arts and sciences and a school of education. It was incorporated in 1861. It aims to impart a college education. There are three general courses—classical, scientific, and pre-medical. There is a high-school department in buildings separate from the college activities.

The Princeton Preparatory School was founded in 1873 by Princeton University as a preparatory department of the college. The school was purchased in 1889 by John B. Fine, a Princeton graduate and the present headmaster, and became a private school under his management. The school gives personal attention to a limit of 125 boys and prepares them for college. The regular course covers four years.

In 1863 Peddie School began in a small way in the old brick chapel of the Baptist Church at Hightstown. The trustees of that early day gave themselves unselfishly to their task, and more than one pledged his property to support the school. In 1866 they laid the corner stone of the first building. The school's benefactor and headmaster, Thomas B. Peddie, is considered the founder. He was aided by his pastor, Dr. Henry Clay Fish, whose faith in the school kept alive Peddie's interest. Rev. William V. Wilson bought the school in 1878 for $10,000, when it was sold by the sheriff for indebtedness. He deeded it back to the incorporators for 25 cents, paid his own expenses, and refused to accept remuneration for his work. Co-education was discontinued in 1908 and Peddie became a school for boys.

Blair Academy was founded in 1848 by John

I. Blair. The little colonial house, now known as the Old Academy, was opened as a day school for the children of Blairstown and vicinity. The school grew and in 1850, Mr. Blair provided a building for boarding students. It now has an enrollment of 300 boys and owns 300 acres. After Mr. Blair's death in 1899, his son, DeWitt Clinton Blair, became the school's benefactor. The Academy is situated on a hill above Blairstown in one of the most picturesque mountain regions of the State. Besides the school buildings there are a campus and lake on the premises. The aim of the school is to prepare boys for college or technical institutions.

The Centenary Collegiate Institute, at first a co-educational school, was founded in 1869 by the Newark Conference of the American Methodist Church as a memorial of the centenary of American Methodism observed three years previously. The first class was graduated in June, 1876. In 1910 the school was changed to one for girls. It is interdenominational, but Bible study and chapel attendance are required. Home economics, secretarial, college preparatory, general, academic, and music courses are taught.

Alma College at Zarepath, founded in 1921, is a preparatory school. It also trains teachers for high school and Bible institute positions.

Georgian Court College, Lakewood, founded in 1908 by the Sisters of Mercy of Trenton, is a school for young women. In 1924 it acquired the estate of the late George J. Gould in the pine belt of New Jersey. There are four halls of residence. The mansion of brick and stucco contains living rooms, reception rooms, library and sun terrace, while the sleeping rooms are used by the senior and junior classes. Raymond Hall, of Spanish design, is separated from the mansion by formal gardens. It contains lecture and music rooms, libraries, and domestic science lecture rooms. The court, a group of buildings facing the Italian gardens, contains the auditorium and gymnasium. There is a swimming pool nearby. The campus has 200 acres with golf links, polo grounds and fields for sports.

Courses in domestic science as applied to home duties, and training for educational work in music, arts and sciences, are offered.

The following list includes the principle private schools of the State:

Private Schools—Boys and Young Men

LeMaster Institute, Asbury Park.
Winchester School, Atlantic City.
Blair Academy, Blairstown.
Bordentown Military Institute, Bordentown.
Pingry School, Elizabeth.
Englewood Country School, Englewood.
Kingsley School, Essex Fells.
Freehold Military School, Freehold.
St. Bernard's School, Gladstone.
Peddie School, Hightown.
Stevens School, Hoboken.
Newman School, Lakewood.
Lawrenceville School, Lawrenceville.
Montclair Academy, Montclair.
DeVitte Military Academy, Morganville.
Morristown School, Morristown.
Newark Academy, Newark.
Rutgers Preparatory School, New Brunswick.
Carteret Academy, Orange.
Cornish School, Orange.
Pennington School, Pennington.
Hun School of Princeton, Princeton.
Princeton Junior School for Boys, Princeton.
Princeton Preparatory School, Princeton.
Lance School, Summit.
Oratory School, Summit.
Wenonah Military Academy, Wenonah.
Seton Hall College, South Orange.

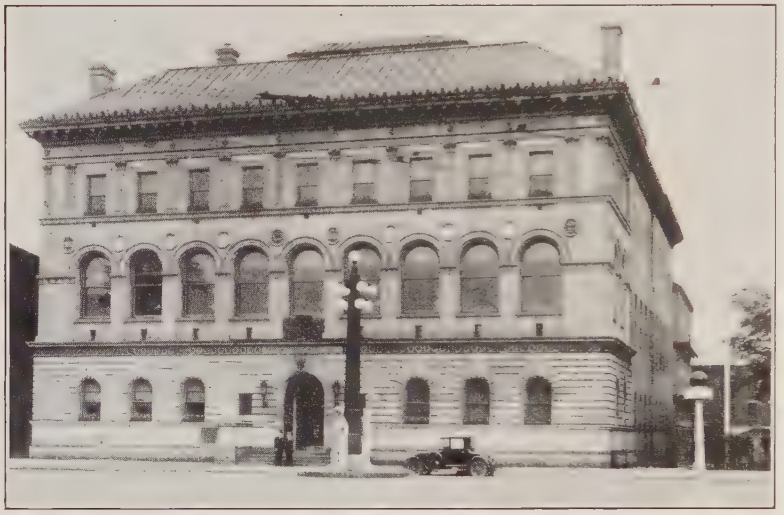
Private Schools—Girls and Young Women

St. Mary's Hall, Burlington.
Vail-Deane School, Elizabeth.
Dwight School, Englewood.
Centenary Collegiate Institute, Hackettstown.
Bergen School for Girls, Jersey City.
Kimberley School, Montclair.
College of St. Elizabeth, Convent Station
St. John Baptist School, Morristown.
St. John's School, Mountain Lakes.
Prospect Hill School, Newark.
Miss Beard's School, Orange.
Dearborn-Morgan School, Orange.

BURLINGTON COUNTY LIBRARY, RURAL DELIVERY

LOBBY OF THE MUSEUM OF FINE ARTS, MONTCLAIR

NEWARK PUBLIC LIBRARY, CHILDREN'S ROOM



NEWARK PUBLIC LIBRARY, MAIN BUILDING

NEWARK PUBLIC LIBRARY, BUSINESS BRANCH

NEWARK MUSEUM, ENTRANCE GALLERY AND COURT

Rosemount Hall, Orange.
Seguin Physiological School, Orange.
Hartridge School, Plainfield.
Kent Place School, Summit.
Oak Knoll School of the Holy Child, Summit.
Rose Haven School, Tenafly.
Bowen School, Trenton.
Georgian Court College, Lakewood.

Private Schools—Coeducational

Tahoma, Bernardsville.
Caldwell Country Day School, Caldwell.
Somerset Hills Preparatory School, Far Hills.
Bancroft School for Retarded Children, Haddonfield.
Hoboken Academy, Hoboken.
Brookside School, Montclair.
Moorestown Friends' School, Moorestown.
Leacroft, Morristown.
The Peck School, Morristown.
Newark Preparatory School, Newark.
Neidlinger School, Orange.
Newark Normal School for Physical Education and Hygiene, Orange.
Varick School, Orange.
Collegiate Institute, Paterson.
Miss Fine's School, Princeton.
Rumson School, Inc., Rumson.
Modern School, Stelton.
Prospect Hill School, Trenton.
Rider College, Trenton.
Training School at Vineland, Vineland.
Alma Preparatory and Alma College, Zarepath.

LIBRARIES AND MUSEUMS

New Jersey has 275 municipal libraries, nine county libraries, and two great university libraries. There is a State Library at Trenton and a Public Library Commission. The libraries of the State contain more than 4,000,000 books and circulated in 1927 more than 11,000,000 volumes. Only four municipalities of more than 2000 inhabitants are without library service.

The New Jersey Library law authorizes the establishment of a library in any community by a vote of the people. It allows the library for its support the revenue from not less than one-third of a mill and not more than one mill tax. Under this law libraries are able to give service in recreational, educational, industrial and professional lines. By a system of interlibrary loans books in one library are available to all other libraries of the State, except such books as are for reference use. This enables the resident of the smallest community to procure books for study and research.

The earliest record of a public library in the colony of New Jersey is that established at Trenton in 1750 by Dr. Thomas Cadwalader, first Chief Burgess. Money was given by John Lambert Cadwalader, great-grandson of Thomas Cadwalader, to build the reference room of the present municipal library at Trenton. Governor Belcher wrote to William Morris in 1752 regarding the "better establishment of our Trenton Library."

The early Quaker libraries of New Jersey form an interesting study and played an important part in the educational development of the State. Those still in existence are at Burlington, Woodbury, Salem, Moorestown, Mount Holly, Bridgeton, Woodstown, and Haddonfield. That at Burlington was established in 1758. Most of them, while still retaining their entity, are merged in municipal libraries. They contain old books and documents, which are well worth inspection.

The old library at Middletown, now a part of the Middletown Township Library, was started over a hundred years ago with the avowed purpose of affording the "populace an opportunity to learn enough to keep out of the hands of the sheriff."

A number of New Jersey libraries have a national reputation for some special line of work. The Newark Public Library is particularly noted for its business branch, which renders a specially efficient service to business and professional people. It has many other branches serving outlying sections of the city.

The Jersey City Public Library has an unusual system of branch libraries in fine modern

JERSEY CITY PUBLIC LIBRARY

BLOOMFIELD PUBLIC LIBRARY

MORRISTOWN PUBLIC LIBRARY

TRENTON PUBLIC LIBRARY

buildings, and is said to have a larger portion of its inhabitants enrolled in the library than has any other city in America.

Libraries own buildings in 82 municipalities. Many of these are memorial buildings and are widely known for the beauty of their architecture.

The public library act of 1884 began the movement for free municipal libraries in New Jersey. The large cities immediately took advantage of this act, but smaller municipalities were slow to act. Upon the request of the New Jersey Library Association, the New Jersey Public Library Commission was established in 1900 to encourage public libraries, to aid free libraries, and to circulate books to such people as did not have free library service. It was given charge of a system of traveling libraries formerly operated by the State Library.

The Public Library Commission today acts as an inter-loan bureau for the libraries of the State, besides circulating books of its own through traveling library stations and as special loans for study purposes. Last year 61,789 books were sent out as special loans, and 2954 traveling libraries, showing a circulation of over 900,000. It maintains a reference bureau for the libraries of the State and advises and assists on all library lines, as well as on books and reading. It also conducts a summer school in library economy, established in 1905, and this has had an attendance of 859.

The State Library of New Jersey in Trenton dates from 1796 and has 150,000 volumes. It is a law library and general reference library mainly for the use of the Legislature and the bar, but is free to all the people. Its newspaper collection dates back to 1776. It procures for its collection every book and pamphlet issued on the State of New Jersey. Its collection of early English and colonial law is one of the most complete in America, and its early manuscript documents of New Jersey as a colony and State are of great interest and value. It also specializes on genealogy. As it is a depository library it contains a complete file of government documents.

The university library of Princeton dates from 1746 and is one of the greatest university libraries in the world, containing more than 600,000 volumes.

The county library system is the latest library development in New Jersey and is devised to give to the small towns and rural communities the same service as given to urban communities by municipal libraries. The county library maintains no central library, but puts a reference collection in every school and a station for book circulation in every community. Frequent exchange of books is made by means of a book car with shelves. The county library law was passed in 1920 at the request of Burlington County. There are now nine county libraries, and they circulate more than 2,200,000 volumes each year. It is the policy to establish these county libraries at the rate of one each year, and it is hoped in ten years to have a library in each county which has any rural and small town population. When these county libraries are so established they, with the municipal libraries, will afford library service to every inhabitant of New Jersey.

During the past year New Jersey has been visited by delegates from thirty-two foreign countries coming to see our municipal and county libraries. The Department of Public Instruction cooperates with the Public Library Commission in the establishment and maintenance of libraries in all the high schools of the State.

Much of the sentiment for libraries and reading in the State has been created by the New Jersey Library Association. The two yearly meetings of this association attract librarians and trustees from many States. The association maintains two scholarships for the New Jersey Summer Library School.

The State Library is under the direction of the state librarian, who in turn is under the State Library Commission, consisting of the Governor, Chancellor, Chief Justice, Attorney General, Secretary of State, State Comptroller and State Treasurer.

The New Jersey Public Library Commission consists of five persons appointed by the Governor and confirmed by the Senate, with the State Commissioner of Education and the State Librarian ex-officio members.

The library of the New Jersey Historical So-

NEWARK MUSEUM, JUNIOR DEPARTMENT

NEWARK MUSEUM, CENTRAL COURT

ciety is at Newark. This is a private institution, but it has close connection with the State in the preparation of the New Jersey Archives, of which thirty-seven volumes have been issued.

The Newark Museum Association is a corporation formed in 1909 for the exhibition of articles of art, science, history, and technology, and for the encouragement of the study of the arts and sciences.

At first it had its headquarters in the Public Library building, but later Mr. Louis Bamberger, of L. Bamberger & Company, presented the Museum with the present commodious building which was opened to the public on March 16, 1926.

There have been special exhibitions of leather, radioactive minerals, use of bird and floral motifs in Japanese art, colonial kitchen and early American life, armor and weapons, and evergreens, in the Museum. The Junior Museum has arranged exhibits of stamps, non-poisonous snakes, Junior Red Cross work and hobbies and toys.

There are 6,406 exhibits in the lending collection, which lends material to teachers for class room use. This department has prepared 340 industrial exhibits in chart form.

In 1913 a "museum on wheels," with charts and a hundred simple minerals, was sent out, and this has grown so that the traveling exhibits include physical geography models, material illustrating the lives and customs of peoples and races, weapons, toys and pottery, costume dolls, textiles, nature study material, and economic products.

The Junior Museum is in a separate room housing more than 2,000 objects. Children in groups are guided about by the members of the staff and encouraged to name their preferences among the objects exhibited. The work is instructive and tends to develop in children a real and lively interest in many things not otherwise offered to their imaginations.

TYPOGRAPHIC LIBRARY AND MUSEUM, JERSEY CITY

Located in one of the buildings of the American Type Founders Company. Privately owned but open to the public on business days

The Typographic Library and Museum of the American Type Founders Company, Jersey City

The Typographic Library and Museum of the American Type Founders Company in Jersey City, established in 1908, has an international fame as a library of libraries. It concerns itself only with the graphic arts. It has exhibits from the days before the invention of typography, with books and inscriptions on palm leaves, clay blocks, papyrus, vellum, and printing from wood blocks.

Its examples of typography include works of the first typographers, Gutenberg and Schoeffer, and of the printers of the Fifteenth Century, and the work of the more celebrated printers of every country, and in every century until the present day.

Other classifications are the general literature of printing in all languages; Frankliniana of rare and unique items; type specimen books from 1486 to date; text books in all languages; books and broadsides relating to the liberty of printing; books and pamphlets on journalism; newspaper publishing and advertising, with first and special historical editions of leading newspapers of many countries, and examples of fine bookbinding; books on the history of writing and alphabets and engraving processes; tiny books, prints and portraits relating to the history of the graphic arts and its exponents; autograph letters and manuscripts; and ancient printing presses and printing appliances.

The Library and Museum are open to the public on business days, though they are the property of the American Type Founders Company.

COVERED BRIDGE OVER THE NESHANIC RIVER AT MONTGOMERY, SOMERSET COUNTY
This bridge is over 200 years old and is still in use

Chapter V

Agriculture in New Jersey

GENERAL CONSIDERATIONS

Along with New Jersey's growing population and industrial expansion, certain changes have taken place in agriculture. Up to 1880 both the number of farms and the acreage of improved land increased. Since 1880 both have declined, although the number of farms is an uncertain index. According to the 1925 census New Jersey has 29,671 farms with nearly 2,000,000 acres, of which 1,311,528 acres is improved land. All but six counties have over 1,000 farms (Cape May, Essex, Hudson, Ocean, Passaic, and Union), and six counties have over 2,000 farms each (Burlington, Cumberland, Gloucester, Hunterdon, Monmouth, and Salem.) The most rapid decline in farm acreage has taken place in the five northern counties of Bergen, Passaic, Essex, Union, and Hudson, and in the one south Jersey county of Camden. From 1910 to 1925 the number of farms in New Jersey declined from 33,487 to 29,671, but most of this decrease took place between 1910 and 1920.

The number of people actually living on farms in New Jersey from the 1925 census was 139,255, or about four per cent of the State's population. This percentage is much lower than the average for the United States.

Tenancy is a question that arouses discussion. In New Jersey from 1910 to 1925 the percentage of farms operated by tenants decreased from 24.8 to 15.9. Atlantic County has the lowest, 3.9 per cent. Four counties (Salem, Sussex, Mercer, and Burlington) all have over 20 per cent of their farms operated by tenants. For the United States as a whole the percentage of tenancy is 38.

The total acreage in farms has been declining, and from 1910 to 1925 it has declined 25 per cent (2,573,857 to 1,924,545). However, 40 per cent of the total land area is in farms.

Agriculture in New Jersey represents a large investment. From 1910 to 1925 the value of all farm property has risen from $254,832,665 to $311,084,284. Of this total, real estate is 84 per cent, or $262,536,810. Farm machinery investment has about doubled since 1910, now being $23,452,000, or 7½ per cent of the total farm property. Livestock on the farms was valued at $25,000,000, or around eight per cent of all farm property.

With the decrease in farm-land acreage and increase in equipment, such as trucks and tractors, the horses and mules on farms have declined in the same period from 93,000 to 62,000, or just about one-third. This is a larger percentage of decrease than that of the farm land. The total number of cattle has declined over 30 per cent, but cows only about 10 per cent. According to the 1925 census, there was more milk produced in 1924 than in 1919 by nearly 6,000,000 gallons, with 8000 fewer cows.

Sheep have declined from 30,683 to 5,684; swine from 147,000 to 55,854. Chickens have increased from 2,320,439 to 4,113,622, or 77 per cent, from 1910 to 1925. Eggs have increased by a larger percentage, indicating greater production per hen.

In general there has been a decided decrease in acres in crops such as corn, small grain, and hay. On the other hand, small truck crops have increased until in 1924 they represented 123,730 acres, and in 1926 134,000 acres. This trend will probably continue owing to increasing population or market and high fixed costs.

With this $300,000,000 investment, for the last three years the farm industry in New Jersey has been producing around $100,000,000 worth of major products. In 1926, for corn and grain this was $11,000,000; hay, $9,000,000; potatoes, both white and sweet, $17,900,000; fruit,

including apples, peaches, pears, and grapes, $9,000,000; cranberries, $1,800,000; 23 truck crops, $27,000,000, and all dairy products, $16,000,000.

Dairy products in Sussex County amounted to over $2,000,000, and in Burlington, Hunterdon, Salem, and Warren over $1,000,000 each. The total value of eggs produced in New Jersey was $11,515,000, over $2,000,000 of which was for Cumberland County and $1,000,000 in Hunterdon County. The value of chickens raised was $7,248,127. Poultry has become a $20,000,000 industry. There are six truck crops that have done consistently over $1,000,000,—tomatoes (can-house and market), sweet corn, strawberries, string beans, asparagus, and peppers. Lettuce had been in this group until recently, when it fell to around a half-million. Cabbage is well toward being a million-dollar crop. Of course some of these crops are fed on the farm and do not represent sales, but even allowing for this, New Jersey's farm business, with its $300,000,000 investment, is a big industry.

The 1925 census reports that 24,906 farms paid out $16,469,007 for feed alone; 20,191 farms spent $8,597,114 for fertilizer and lime; 15,476 farms paid for cash labor $14,186,113; 10,643 farms expended $2,282,876 for lumber, posts, etc. The four items of feed, fertilizer and lime, labor, and posts and lumber cost over $41,000,000.

In the 1925 census reports 8 per cent of New Jersey's farms were on concrete or brick roads; 15.5 per cent on macadam roads; 26.2 per cent on gravel roads; 8.1 per cent on improved dirt roads; 34.7 per cent on unimproved dirt roads, and 7 per cent on all others, including those not reporting this item.

Most excellent sources of information for the farmers of New Jersey are available through the Agricultural Experiment Station and the Agricultural Extension Service of the State University and the State Department of Agriculture. County agricultural agents are placed in every farm county to help with local farm problems.

Climatic conditions are moderate, with fairly uniform rainfall and an average monthly precipitation of close to four inches. The length of the growing season ranges in the northern

POTATO FARM, DEERFIELD

TOMATO FIELD, CUMBERLAND COUNTY

section from the first to the fifteenth of May to the latter part of September or the first part of October; in the central part from the latter part of April to the first part of October, and in the southern section from about April 20th to October 15th.

New Jersey ranks among the highest States in acreage devoted to commercial production of the following crops: Strawberries, cucumbers, lettuce, onions (the intermediate crop), peas, spinach, sweet potatoes, and tomatoes. In Passaic, Bergen, and Essex counties there is one of the most intensive market gardening sections of the country. The value of produce raised in nurseries and greenhouses amounts to over $6,000,000.

The growing use of electricity in New Jersey agriculture offers unusual advantages. The power companies employ an expert who studies new methods of electrifying farm processes. Power-transmission lines, particularly in rural south Jersey, cover a wide territory. The Department of Agriculture reports 10,000 farms in south Jersey (353,000 acres), producing mainly garden truck of an annual value of $34,000,000. Over 2300 of these farms are now partially or wholly electrified. Other New Jersey power companies serve comparable areas.

Overhead electric irrigation is being developed, and the pumping equipment for this is now equivalent to the pumping for a city of 40,000 people.

New Jersey farmers use electricity for illuminating, for pumping water, feed grinding, ensilage cutting, hoisting hay and other materials, fruit grading, milking, clipping, running separators, churning, refrigeration, ventilation, incubation, brooding, and stimulating egg production.

Farm Crops

Farm crops are those which are raised extensively or on a field scale. Broadly speaking, the term would include not only grain and forage crops, but fruits, vegetables, and ornamentals as well. It is the custom, however, to class the latter as horticultural crops and to include in farm crops the following: Grain crops, forage crops, pastures, green-manure crops, and potatoes.

WAITING FOR THE TOMATO BOAT THAT PLIES THE COHANSEY RIVER

FIELD OF POLE BEANS NEAR PORT NORRIS

The grain crops and pastures of New Jersey are devoted primarily to the support of its livestock industry, dairy animals mainly, but to a lesser extent the poultry flocks and the work stock. Green-manure crops are grown to maintain the productivity of the soil, principally for vegetable and potato growing. The potato crop is the only cash or market crop which is generally considered a farm crop in this State.

The grain crops include corn, wheat, rye, oats, and buckwheat. Corn is grown in all counties, largely for the grain, but to a considerable extent for silage and fodder. Wheat and rye are the grain crops that are sold off the farms to a considerable extent. These grains largely find their way into stock feeds, however, rather than into food for human consumption. Oats are consumed almost entirely on the farms producing them. Buckwheat is raised to only a slight extent.

The crops used for hay occupy a larger acreage than any other crop; the total acreage devoted to hay, according to the 1925 census, was 281,532 acres. The hay crops consist of timothy alone, timothy and clover mixed, clover alone, alfalfa, other tame grasses, small grains cut for hay, annual legumes cut for hay, and wild grasses cut for hay. The total production in 1925 was 411,379 tons. The acreage of alfalfa is increasing rapidly and should eventually constitute an important part of the total hay crop, especially on farms devoted to dairying. Such forage crops as roots and soiling crops are of minor importance in this State.

The area devoted to pastures in the State, according to the 1925 census, was 335,057 acres, which is larger than that devoted to any crop or group of crops. Pastures are used to furnish dairy animals and work stock with summer grazing during approximately six months of the growing season.

The green-manure crops include those raised primarily to improve the productivity of the land. They are depended upon to supply organic matter, to conserve plant food, and to prevent the soil from blowing and washing. The most important group in New Jersey are the winter wheat crops. In central Jersey it is almost universal to sow a winter cover crop,

A GOOD CRY IN EVERY HILL—AN ONION FARM IN CEDARVILLE

usually rye, after potatoes, to be plowed down the following spring. On the vegetable-producing farms the practice of sowing winter cover crops after market crops are harvested is rapidly increasing. The crops used for this purpose are rye, wheat, hairy vetch, and various of the clovers.

The area devoted to potatoes in 1925 was 62,201 acres and the production was 8,514,815 bushels.

Soils and Fertilizers

The fertilizer industry in New Jersey has been built up very largely within the last half-century. Before fertilizers came into general use many farmers in the southern counties of the State had used greensand marl extensively on their farms. It was used principally for the phosphoric acid and potash it contained, though some deposits were rich in shells, and the marl thus became a source of agricultural lime.

As early as 1830 Thomas Gordon wrote: "It would be difficult to calculate the advantages which the State has gained and will yet derive from the use of marl. It has already saved some districts from depopulation and increased the inhabitants of others, and may one day contribute to convert the sandy and pine deserts into regions of agricultural wealth."

Dr. George H. Cook, in his "Geology of New Jersey," published in 1868, speaks as follows with reference to marl for agricultural purposes:

"Marl has been of incalculable value to the country in which it is found. It has raised it from the lowest stage of agricultural exhaustion to a high state of improvement. Found in places where no capital and but little labor were needed to get it, the poorest have been able to avail themselves of its benefits. Lands which, in the old style of cultivation, had to lie fallow, by the use of marl produce heavy crops of clover, and grow rich while resting. Thousands of acres of land which had been worn out and left in commons, are now, by the use of this fertilizer, yielding crops of the finest quality. Instances are pointed out everywhere in the marl district of farms which in former times would not support a family, but are now making their owners rich from their productiveness. Bare sands by the application of marl are made to grow clover, and then crops of corn, potatoes, and wheat. What are supposed to be pine barrens, by the use of marl are made into fruitful land. The price of land in this region was considerably below that in the northern part of the State forty years ago; now that the lands are improved their prices are higher than those in the northern part of the State, though even there they are higher than anywhere else in the United States."

Other geologists and chemists have continued the work so ably carried on by Dr. George H. Cook, with the result that a commercial method has been developed for the extraction of the potash from the greensand.

For many years the potato industry in New Jersey had been placed at a disadvantage on account of the heavy losses due to the scab fungus. Among the many remedies that were tried was the use of sulphur. At first it was not quite clear just how the sulphur aided in repressing the scab, but finally it was learned that sulphur increased the acidity of the soil, and this led Dr. J. G. Lipman to suggest that the sulphur was acted upon by soil organisms which converted it into sulphuric acid. Further researches demonstrated the truth of this, and now potato growers are instructed to use sulphur or fertilizers giving an acid reaction for the purpose of combating the scab fungus.

Some thirty-five or forty years ago New Jersey farmers were experimenting with organic nitrogenous fertilizers such as tankage, blood meal, fish scrap, and leather waste. The demand for more definite information finally led to carefully planned research along two different lines. An exhaustive experiment was planned for the purpose of comparing materials of this class with the so-called standard materials, such as nitrate of soda and sulphate of ammonia, in the growing of crops.

This work has now been under way for thirty years, and the experiments have definitely shown that nitrogen in the organic form is generally less efficient than in the mineral form. Nitrogen in the organic form now costs approximately twice as much as in the mineral form, and these conclusions will enable the

farmer very materially to reduce his expenditures for fertilizers without any loss in efficiency.

The other piece of research had as its object the discovery of laboratory methods for determining the availability of the nitrogen in low-grade organic nitrogenous materials. A method of treatment was successfully worked out, and now leather scraps, wool waste, and similar materials that originally had little value and which the laws of some States actually declared could not be used in fertilizers, have come to be sources of valuable fertilizers.

Up to about the last decade of the last century the use of lime in agriculture was governed very much by rule-of-thumb methods. In some cases high-grade calcium was used and in others magnesian lime was considered satisfactory. But farmers were asking questions as to the relative value of the two kinds of lime and the amount to use, and again field and greenhouse experiments made comparative studies of the two forms. These experiments, covering a period of twenty years, have shown that both forms may be used with equal success, and much has been done in determining how much lime is required under varying soil and crop conditions.

Human and Animal Nutrition

The problems in human and animal nutrition in the State of New Jersey are those of the inhabitants of a thickly populated area living under artificial conditions as compared with the more natural environmental conditions of sparsely populated regions. It has been amply demonstrated that growth, reproduction records, and general health of experimental animals can be influenced by the nutritive value of the diets supplied. The confirmation of this principle in the case of humans and domestic animals, and education in their application, are of utmost importance. Much valuable work has been done in the dissemination of modern principles of nutrition, but much is yet to be done in putting this information into the hands of the people of the State.

Although the State is well equipped with transportation facilities, so that fresh foods are available throughout the year, yet much of the food consumed by humans is subjected

MODERN IRRIGATION INSTALLATION, LOCUST WOOD FARM, WESTVILLE, GLOUCESTER COUNTY

GRAPE HARVESTING AT VINELAND

to processing. Any treatment that is given, such as drying, sterilizing, or boiling, is liable to change its nutritive value. Certain foodstuffs offered to livestock are subjected to processing, and with the increasing application of factory methods to farm practice, more processing of agricultural products is to be expected. Thus artificial drying of hay crops may become a common practice in the future.

The nutritive value of plant products may depend upon the composition of the soil, and a study of this relationship would be worth while in New Jersey, in view of the long period of use to which the soil has been subjected and the necessity of applying fertilizers.

Certain nutritive properties of foods of animal origin, notably eggs and milk, are influenced by the ration fed, and because of the extensive human consumption of these foods, it is essential that studies be made of them. Many citizens work at sedentary occupations, usually indoors. The food requirements of this class, so that deficiencies may be prevented or remedied, call for chemical and nutritional investigation. It is quite possible that much of the economic loss due to infections, such as the common cold, might be avoided if more information were available as to the relation of diet and environment to the resistance to infection.

Infectious diseases in poultry flocks in parts of the State have brought about a program of rearing in confinement. Success in this must depend upon the fundamental knowledge of the complete nutritive requirements of the species. Fertility and hatchability of the eggs will undoubtedly be influenced by the ration.

Dairy cows are confined for at least part of the year. The cow is restricted to feeds selected by man, and studies of nutritional requirements are imperative for maintenance of maximum production, high quality milk, and reproduction of the best strains.

In some cases swine are allowed the free choice of food, but many of these animals are raised and bred on a garbage ration. Difficulties in this phase of the industry are encountered in maintaining correct environmental conditions.

MILES OF POTATOES IN MONMOUTH COUNTY

The influence of environment on the metabolic processes makes desirable studies on the effect of such factors as humidity, temperature, and light, especially the ultra-violet portion of the spectrum, on the human and animal organism.

AGRICULTURAL MARKETING

Marketing facilities for the farms and truck gardens of New Jersey are available right at the door, with New York City on one side and Philadelphia on the other, in addition to the manufacturing cities, country towns, and villages within New Jersey. The rapidly growing seashore resorts make available through the summer months an added market, and it has been estimated that they bring in an extra population for the summer months amounting to around three-fourths of a million people. Further transportation facilities of roads, bridges, and tunnels that are being planned on a generous scale will no doubt help greatly to further this growth.

There are many cities in New Jersey which have curb and municipal farmers' markets, where the consumers buy directly from the producers, aside from regular wholesale market places for farmers.

The 1925 census reports that co-operative farm sales amounted to $2,309,491, and farm purchases of materials, etc., $956,753. Since population has much to do with markets available to agriculture, these facts are pertinent. The population of New Jersey has grown steadily ever since colonial days, but the largest expansion took place between 1840 and 1870, when the increase was about 3 per cent annually. Since then the rate of increase has declined to about 2.5 per cent.

With an increasing growth in population and a stationary area, there is of course an increasing density. In 1800 there were 28.1 persons to every square mile in New Jersey, and in 1920 this had increased to 420 persons per square mile.

A large proportion of the population is urban. In 1890 the census indicated slightly over 60 per cent as urban, and in 1920 this had increased to over 78 per cent. The rural population is defined as "that residing outside of incorporated places having 2500 inhabitants or more." The farm population proper, persons living on farms, is much smaller than the rural population. According to the 1925 census the farm population was 139,255, which comprises all persons living on farms and includes "considerable numbers" engaged in occupations other than farming. The leading counties in farm population are Cumberland, Monmouth, Burlington, Gloucester, and Hunterdon.

In recent years hundreds of farmers' roadside markets have been developed, and this is a prominent trend in the fruit-growing industry. Many growers are devoting time and thought to the production of fruits of high quality that appeal to the automobile trade.

VEGETABLE GROWING

New Jersey was one of the first States to develop the production of vegetables on a commercial scale. At first there were market gardens near the large centers of population, such as New York and Philadelphia. As the population increased and the demands for fresh vegetables grew, it became necessary to find larger areas of cheaper land, and this resulted, in south Jersey, in the development known as truck farming. Aside from producing vegetables for market, the canning of vegetables for market has become an important industry and makes a fine outlet for many acres of tomatoes, lima beans, peas, pumpkins, squash, and other crops. New Jersey has always ranked high in the commercial production of sweet potatoes, asparagus, tomatoes, string beans, peppers, and eggplants.

Market gardening sections have been developed in north Jersey, in Hudson, Essex, Passaic,

CATTLE COMING TO WATER, SALEM COUNTY

COHANSEY RIVER TOMATO BOAT READY TO START FOR MARKET

Morris, and Middlesex counties, while truck farming has had its place in southern Middlesex and the counties to the south. A gradual shifting of the intensive vegetable farms to such points as Freehold and Vineland is taking place, and will continue as the land in the metropolitan areas becomes more valuable.

Another factor is the competition from distant producing regions. In 1923 the average haul for fresh fruits and vegetables to the New York market was 1500 miles, and 40 States and nine foreign countries helped to supply the Philadelphia market with fresh fruits and vegetables.

In the future, as many counties in New Jersey become more urban in character and with increased competition in many of the truck crops, the tendency will be toward a more intensified production of vegetable crops. New Jersey has some of the best markets in the world at her door and by producing high quality products, carefully graded, should be able to keep her place as a leading State in the production of vegetables.

DAIRYING

There are over 145,000 dairy cattle in New Jersey. According to Government figures dairy cattle in New Jersey in proportion to the number are valued higher than in any other State. On the same basis the State ranks first in the amount of advanced registry work done and is among the first five States in the percentage of cows on test in cow-testing or herd-improvement associations. The Holstein and the Guernsey breeds predominate, yet there are Jersey and Ayrshire breeders who are among the world's leaders.

New Jersey is primarily a market milk state. Although several of the country's largest producers of certified and modified milk are here, considerable milk is imported, which indicates the opportunity for expansion. The proximity to large centers of population and the advantage of collective marketing are assurances of fair prices to any dairy farmers familiar with intensive and up-to-date practices in producing a high grade of market milk.

There are now seventeen cow-testing associations, and the breeders of Holsteins, Guernseys, and Jerseys have well-organized State breed associations. There are county breed associations in Burlington, Salem, Cumberland, Gloucester, Mercer, Hunterdon, Somerset, and Warren counties.

The members of these associations are substituting pure breeds for unprofitable animals as fast as they learn the condition of their stock.

The value of the dairy industry in New Jersey is shown by these figures:

	1925	1926
Number of cattle	156,000	147,000
Value of cattle	$10,390,000	$12,830,000
Value of dairy products	15,087,874	18,000,000

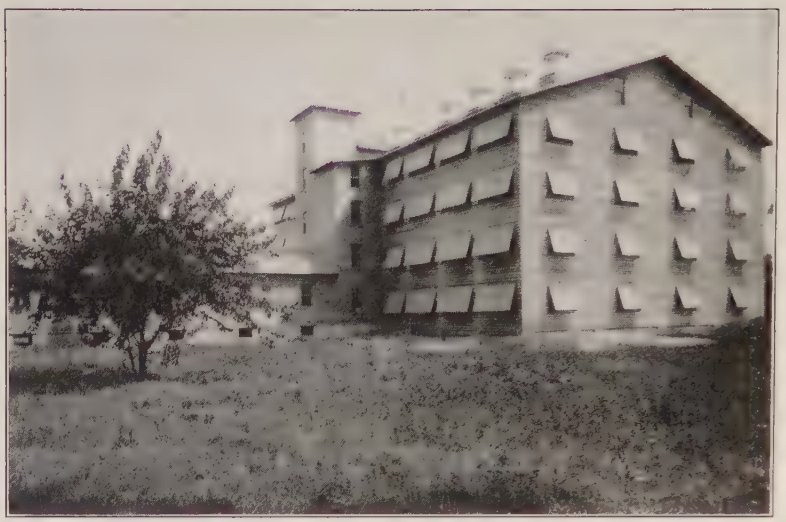
That there is more milk obtained from fewer cows in New Jersey is proved by these figures:

	1919	1924
Number of cattle	172,693	153,492
Quantity produced, gallons	54,135,989	76,245,204
Average per cow, gallons	532	651

A comparison of the production and the money returns of the average cow and the good cow in the State, meaning by the "good cow" the average for the test-association cow in 1926, is given thus:

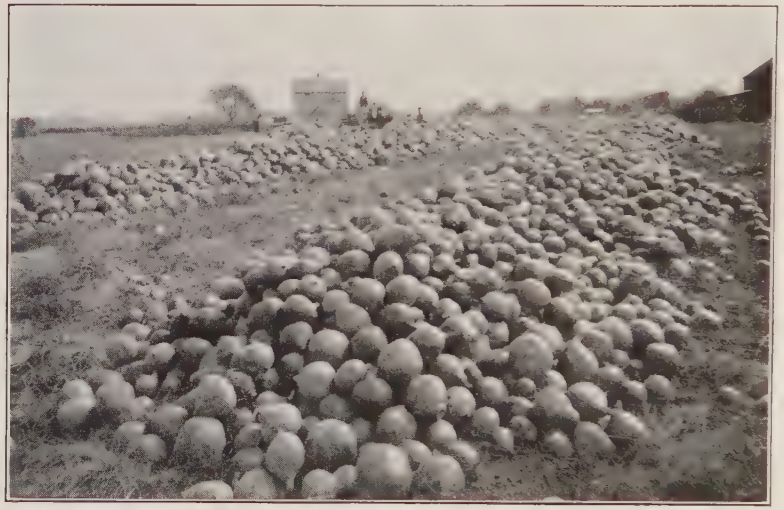
	Yearly Milk Yield, Pounds	Butter-fat Yield, Pounds	Feed Cost	Returns Over Feed Cost	Feed Cost per 100 Pounds of Milk
Good cow	8,000	285	$126	$167	$1.44
Average cow	5,600	221	116	108	2.10

PACKING ASPARAGUS AT FAIRTON



EGG-LAYING HOUSE AT VINELAND

SQUASHES AT BRIDGETON CANNERY



PUMPKINS AT CANTON

There are 88 creameries in operation in New Jersey. In 1926, in addition to much milk that was bought at a flat rate per quart, approximately 140,000,000 quarts of milk were purchased from 4000 farmers on the basis of its butterfat content. Of this about 60 per cent was sold in New Jersey markets as fluid milk and the remainder went either to New York City or Philadelphia or was manufactured into by-products. The average price paid for this milk was six cents per quart.

Outside of market milk the other important dairy product is ice cream. During 1927 the State ranked seventh in its production, and the value of its manufacture amounted to $12,900,000. Only a comparatively small amount of butter, cheese, and powdered milk is produced.

Through legislation, education, and disease control, the quality of the milk supply is continually improving. A study of the bacterial counts of the milk of producers and distributors shows an almost invariable reduction during fifteen years. The inspection and the control work of certain milk companies and marketing associations have been conducive to improved quality. The payment of a bonus for low bacteria and adequate butterfat percentage is another recent practice inaugurated by some of the companies. The elimination of tubercular cattle is one of the biggest factors in the improvement of New Jersey's milk supply. There are 4,648 herds with 23,217 cattle under supervision for the eradication of tuberculosis.

When a herd is tuberculin-tested the owner immediately becomes a more painstaking producer, and cleaner and more wholesome milk is the result.

POULTRY

The tendency toward intensification of farming methods and specialization as to farm products has resulted in New Jersey's taking a conspicuous place in poultry-keeping. It forms one of the major branches of farming, reaching especially high development in such communities as Vineland and Toms River.

New York City is essentially a white-egg market, paying a premium for the white over the brown-shelled egg. Back somewhere in the middle of the last century the modern Leghorn poultry farm, producing white-shelled eggs exclusively, was introduced into New Jersey. The New York City market had been depending upon States to the west for the bulk of its supply, and practically all of these eggs were farm-produced and had brown shells. Generally they did not reach the consumer in first-class freshness. The newly-established nearby Leghorn plants were placing ever-increasing supplies of strictly fresh white-shelled eggs upon that same New York market. It is not strange that the metropolitan consumer soon came to correlate shell color with egg quality.

The efficiency of the egg-type fowl, as the Leghorn, has resulted in that breed becoming the favorite in the modern poultry industry in New Jersey, and it represents 90 per cent of the poultry population in the commercial industry of table-egg production. The economic conditions that have caused greatly increased land values in those sections adapted to commercial poultry-keeping have been brought about by more efficient management, more prolific fowls, and more intensive methods.

The second event in the development of this type of poultry raising has been the growth of the baby-chick industry. New Jersey proudly claims Mr. Wilson, of Stockton, as the first poultryman to send day-old chicks through the express or mails. From that original attempt in the latter part of the last century has grown the whole baby-chick industry of this country, measured in millions of dollars. The Frenchtown section of New Jersey, in which Stockton is located, has developed as a great center for this business. Huge hatcheries sending forth thousands of baby chicks each spring have sprung up over the State, and this industry has opened up opportunities to large numbers of poultrymen.

The third step in the development of modern poultry-keeping in New Jersey is the use of the

DUCK RAISING FOR EGGS AND FEATHERS, VINELAND

MOORESTOWN COMMUNITY HOUSE GARDEN

SHELTER ON A DUCK FARM NEAR VINELAND

trap-nest and the egg-production performance record and pedigree breeding. Research work has emphasized the fact that individual hens vary widely, even within varieties and breeds correlated with egg-production performance. In 1916 an egg-laying contest providing space for 100 poultry flocks of 20 pullets each was established at Vineland, where the best pullets from the farms entering could be officially trap-nested and recorded. In 1919 a similar contest was established in north New Jersey in Bergen County. The department of poultry husbandry at the New Jersey Agricultural Experiment Station officially conducts these projects. Many thousands of officially recorded hens have been turned back to the owners to be the nuclei of improved breeding flocks from which general egg-production flocks have been reared.

In 1925 a State-inspected plan was developed whereby poultry-breeders might trap-nest unlimited numbers of birds at home. Over 12,000 pullets and hens are now being trap-nested under this supervision.

With the growth of the industry along intensive lines, wherein the number of fowls kept per acre has materially increased, poultry diseases and parasitic infections have developed. The discovery of the presence of such diseases and parasites has led to a program of prevention based upon sanitation of most modern character and a scheme of management looking toward the prevention rather than the treatment of such troubles. A plan was put in force for the testing of all adult fowls for the presence of "carriers" of these organisms. The second event along this line of trouble prevention has been the gradual building up of methods of chick rearing which would prevent infestation of growing stock.

The present conditions in the poultry industry of New Jersey are undoubtedly the summation of the economic and production conditions which have prevailed during the years in which commercial poultry keeping has been advancing from obscurity among agricultural pursuits to the position of being recognized universally as one of the major agricultural industries of the State.

Among new methods of management is artificial illumination in laying houses during

the winter period, which has intensified egg production.

The future of the poultry industry in New Jersey promises well. It cannot be overlooked that the egg consumption per capita tends to increase every year as people come to realize more generally the great food value of fresh eggs, and as the modern poultry industry works out methods whereby the average consumer may secure at reasonable prices strictly fresh high-quality eggs.

The poultryman knows with some degree of accuracy about how many eggs he may expect the average hen in his flock to lay in the course of a year. He also knows with considerable accuracy what the distribution of those eggs over the year period will be season by season. He knows about how many producing units, or laying fowls, he may be able to take care of. He knows approximately what prices season by season he may reasonably expect the average consumer to be willing to pay for the product of his farm.

These three factors place certain limitations before the poultry producer. His success in making a profitable enterprise out of poultry and egg production in New Jersey will lie largely in his ability to produce a more efficient hen and one that will be a more dependable breeder; in his improvement of his own efficiency as a production manager; and in his ability to work with his fellows in the establishing of more efficient methods of reaching the ultimate consumer with his products.

ORNAMENTAL HORTICULTURE

There are 314 substantial nurseries in the State. Many are annual prize winners at the marvelous exhibits in Grand Central Palace, New York City. There are other annual flower shows within the State at city and county park nurseries. People come from far and wide to see the floral displays of New Jersey nurseries, and depart with a realization that this is "The Garden State."

Some of the most beautiful productions of prize-winning orchids are shown each year by Julius Roehrs Company, of Rutherford. It is worth a special trip to Riverton in mid-September to see the truly gorgeous display of cannas by Henry A. Dreer, Inc. Each spring Bobbink and Atkins, of Rutherford, have a perfect fairyland of iris in their fields on the slopes of Clifton. This firm conducts the experimental rose garden of the United States Department of Agriculture at Arlington, Virginia.

The Plainfield Nurseries at Scotch Plains have one of the best and most varied collections of evergreens. L. B. Coddington at Murray Hill, Charles Totty at Madison and George L. Ehrle at Richfield are outstanding specialists of national reputation as developers of roses. The Peacock Dahlia Farms, just off the road from Berlin to Williamstown, fascinate every lover of flowers who visits them. Thousands of acres are intensively cultivated by the nurserymen of New Jersey. Those cited are some of the most widely known to the people of this and other States.

Ornamental horticulture was not mentioned in the census reports until 1890. The first known florist's establishment in New Jersey was started between 1820 and 1830. The exact date is not known. The number—wholesale and retail—in 1920 was 753, with an area of 8,577,827 square feet covered by glass, and having sales of $5,064,684. In the 1890 census it was estimated that 65 per cent of the products are marketed at wholesale, while 35 per cent are marketed at retail. The retail flower trade in the larger cities is considerable.

In 1900 the leading counties in area covered by glass in order of rank were: Hudson, Morris, Essex, Bergen, Union, Passaic, Monmouth, Mercer, and Burlington. The glasshouse production of flowers is segregated in the metropolitan area. Morris County is the seat of the rose-growing industry, particularly in the neighborhood of Madison. The Bergen-Passaic district is largely concerned with the production of pot-grown plants and miscellaneous cut flowers.

There are only a few strictly fruit-tree nurs-

eries, most of the others carrying some fruit trees as an accessory. The period from the 1920 census to the present has witnessed a considerable expansion in ornamental nurseries. One cause is the plant quarantine act, a virtual embargo on the importation of nursery stock from foreign countries. The second factor is the growth of urban and suburban communities and the increased use of plant materials. A deterrent to growth, however, has been the Japanese beetle quarantine, which restricts the movement from the State of certain classes of materials without treatment of the soil, thus forcing into unrestricted areas the production of these materials.

In at least three centers broad-leaved evergreens are being propagated on a large scale. Several attempts at growing narcissus and tulip bulbs have been made, but many of the largest plantings have been discontinued. The propagation and sale of dahlias has increased tremendously within the past decade, and New Jersey ranks high in new varieties and in total sales of roots.

Ornamental horticulture in New Jersey, according to the census of 1920, represented an investment of more than $6,000,000, and an income of about the same amount. New Jersey ranked sixth among the States in area of land under glass.

FRUIT GROWING

New Jersey, which is known through the country as the "Garden State," acquired its name from the great variety of fruits, vegetables, and flowers grown in profusion. William Cox, who resided at Burlington, was the first American to publish a book upon horticulture, and as early as the beginning of the Nineteenth Century began rather extensive field tests in the planting and care of fruit trees. From the first introduction of deciduous fruits from the Old World, it was apparent that the climate and soil of New Jersey were particularly adapted to all kinds of such fruits. The soil and climatic conditions vary from the rolling and hilly country of Sussex, in which apples and tree fruits behave much as they do in the New England States, to the sandy and open soils of the southern counties, where the climate is modified by the Atlantic Ocean and Delaware Bay.

The Winesap apple succeeds well in the southern counties. The Oregon Evergreen blackberry, whose culture is largely confined to the milder temperate region west of the Cascade Mountains in Washington and Oregon, grows well in southern New Jersey. The winter temperature south of Trenton in the most severe seasons seldom goes under five degrees below zero. Peach trees are therefore seldom winter-injured as a result of low extremes. Hence, the area of fruit production is expanding.

New Jersey, with portions of Delaware and Maryland, became noted as the first great commercial peach district. Large quantities of apples were not only grown in southern New Jersey but also through the northern counties, including Essex, now largely suburban. Essex was once famous for its apples, strawberries, and other fruits.

New Jersey contributed to the horticultural world such famous varieties of peaches as Early and Late Crawford, Mountain Rose, Smock, Fox Seedling, and Iron Mountain. New varieties of peaches of exceptional quality are being bred within the State and promise soon to restore the reputation held when the Crawford peaches were first introduced. Peach growing at present is centered in the counties of Burlington, Camden, Atlantic, Gloucester, and Cumberland, with considerable areas in other counties. Apple production is extensive in the same counties, and also in Monmouth, Middlesex, Mercer, and Sussex. The production of small fruits and grapes is most extensive in the southern counties. In the counties of Sussex and Warren a combination of dairying and fruit growing is a profitable practice.

There are large areas of land still devoted to general farm crops that are admirably adapted to the culture of fruits. As economic conditions warrant, many of these areas will be brought into fruit production.

LANDIS AVENUE, VINELAND
Large poultry center

YOUNG APPLE ORCHARD AT CRANBURY, MIDDLESEX COUNTY

LIVESTOCK

Livestock for the production of meat and the breeding of horses is not considered as among New Jersey's major agricultural enterprises. In the raising of beef cattle, the margin of profit is much less than in the growing of grains. The demand for raw milk in the metropolitan area offers the farmer a greater income from milk than from meat.

The largest source of beef production in New Jersey is from cows of the dairy herds that have reacted to the tuberculosis test. These animals are slaughtered in the local abattoir for the poorer class of retail meat trade. A few farmers buy "feeders" in the fall and keep them through the winter, selling them in the early spring. In this way the herders are able to feed up their unsalable roughage, while the manure obtained cuts down their fertilizer cost. The only possibility of any increase in the number of beef cattle is in those sections of the State where there is rough land suitable only for grazing.

There are in New Jersey about 10,000 sheep, mostly in the northern counties. More sheep in the northern part of the State could be easily supported. Here there is considerable rough land that would be excellent for grazing, the only objection being the cost of fencing. New Jersey, at the door of the best markets in the East, which especially pay a premium for early lamb, could double its sheep and still not oversupply the market.

There are more swine in New Jersey than any other class of meat-producing animal. Swine raisers are of two types: One is the farmer who is producing general crops and keeping a few brood sows to take care of the surplus. He kills enough of the pork produced to supply his own needs and sells the remainder. The other type feeds garbage collected from the cities. These garbage-feeding plants are found along the shore and in the section around Jersey City and Newark. They vary in size, the number of animals fed ranging anywhere from 300 to 15,000.

The horses found in New Jersey may be divided into two groups—those which are used for heavy work and those used for pleasure. The first group is used for hauling in the cities and for farm work. Practically all of these are brought in from the Middle West, and are sold to the farmer and city trucking men by the local horse dealers. The second group include the animals used in riding clubs, fox-hunts and for racing. They are bred to some extent in the State by wealthy estate owners, and some are brought in through dealers in New York City. The breeding of horses in the East will never be much of an agricultural enterprise owing to the cost of feed and the price of grazing lands.

COMBATING AGRICULTURAL ENEMIES

Plant Diseases

Few people realize the tremendous extent of the losses from plant diseases. The value of the New Jersey potato crop alone is reduced approximately a million bushels each year as the result of leaf roll, mosaic, spindle tuber, and other diseases. Fruit growers suffer enormous losses, apple scab sometimes ruining most of the crop. The peach growers also experience serious crop depreciation from brown rot. During 1926 the losses from plant diseases were estimated as follows: Apple, 11 per cent; peach, 5.5; potato, 26.4; tomato, 18.5; sweet potato, 17.2; corn, 5.5. These yield reductions may not always indicate a corresponding reduction in the value of the crop, since the remainder of the crop may have brought a higher price because of the smaller production.

Many of the important diseases producing pathogenes have markedly different life histories. In the case of cedar rust of the apple the organism alternates between the cedar and the

MODEL DAIRY IN CUMBERLAND COUNTY

MODEL COW BARN
Home and school for children, Vineland

apple. Ordinary spray measures are insufficient for its control, but by removing all red cedars from the vicinity of the orchard the disease is readily controlled. Wheat rust spends part of its life on the wheat and then passes over to the common barberry. By eliminating this plant, no further difficulty is experienced with wheat rust. Peach-leaf curl has a less complicated life history, the organism causing the disease spending all of its existence on the peach.

It is necessary also that some consideration be given to the relation of the organism to environmental conditions. Many of the organisms causing serious diseases to plants show a definite response to such factors as soil moisture and temperature. Others causing diseases of the above-ground parts of plants are influenced by atmospheric moisture and temperature. In the case of potato scab it was early found that the disease was much more severe in soils which had an alkaline than in those with an acid reaction. This discovery led to methods to inhibit the growth of the organism causing scab.

Plant diseases can be controlled, in the opinion of many, by measures of protection, such as the application of toxic materials in the form of spray or dust to the growing plant. This is only one method of controlling diseases, however, and is to be resorted to only after all others have failed. One of the other methods is the modification of environmental conditions as practiced in the control of potato scab.

A second method of disease control is by crop rotation and cultivation. Many potato growers have learned that the continuous growing of potatoes on the same land very often leads to an increase in the amount of scab. Tomato wilt likewise becomes increasingly severe where this crop is planted year after year on the same land. Proper cultivation also is of value in reducing disease. In the orchard the plowing under the old apple leaves affected with scab will assist in reducing the severity of this disease. In the seed bed the stirring of the soil will stop the advance of damping off diseases.

A third method commonly practiced is the eradication of diseased plants or plant parts to prevent the spread of the disease-producing

CULTIVATING AND SPRAYING POTATOES AT FAIRTON

HORTICULTURAL GARDEN, BRIDGETON WATER WORKS

organisms. The growers of seed potatoes make extensive use of this system of control. All plants showing disease symptoms are pulled out and removed from the field.

Another important and widely used method of plant-disease control is disinfection, either of the plant or plant part or of the environment. Probably the most common methods are the disinfection of white potatoes for scab and rhizoctonia, sweet potatoes for scurf, and cereal seeds for smuts. These treatments may either be liquid, using corrosive sublimate or formaldehyde in the case of potatoes; or dry, by using copper carbonate for cereal smuts, or the more recent possibility of the organic mercury compounds.

Another important factor in the prevention of plant diseases is the planting of varieties resistant to disease. In the case of rust of asparagus and of the wilt disease of tomatoes, cabbage, cotton, and other plants, resistant varieties of these plants have been developed.

When, however, all of these measures have failed and diseases still make their appearance, there remains one more step, and this is control by protection; that is, by the application of liquids or dusts to the exposed plant parts. Timeliness of application is the first prerequisite. Success in spraying is also dependent upon covering the plant parts with a film of the spray material.

The more general adoption of these disease control measures will unquestionably result in larger and better crops per acre and this in turn will result in a larger profit for the farmer.

Insects

Profitable crops of fruits and vegetables cannot be produced in New Jersey without reasonably effective insect control. The State Department of Entomology has kept abreast of the progress of knowledge on this vital subject throughout the world; discovered new and better methods of controlling species where there formerly existed no satisfactory and effective procedure, and created special organizations for applying methods of insect control.

The members of every graduating class in agriculture go out with some knowledge of

SANDY HOOK FROM ATLANTIC HIGHLANDS
The latter is the highest point on the coast south of Maine

DELAWARE WATER GAP
An unusual view of the Kittatinny Range in New Jersey

insect problems; each year specialists in insect control are being trained, and insect-control practice among the urban and farm population proceeds along sound lines. These factors all contribute to a minimum loss from insect injury. Insect-control practice grows better each year, and insects of a beneficial character are more extensively utilized. County mosquito commissions have been created and are effecting a measure of protection from the mosquito pest to more than two-thirds of the population. The way has thus been opened for large increases in taxable values, a considerable amount of which has already occurred. The substation for the study of cranberry and blueberry problems has met the problem of insect control on these crops in a satisfactory manner. The substation for the study of the biology of sewage disposal has materially improved old methods and is devising new and more efficient ones for the disposal of sewage wastes at less cost. An organization of apple growers to fight the apple worm was effected in 1926, this group operating nearly 1,500 acres of bearing fruit. In 1925 these growers picked 50 per cent of the fruit free from apple worm, but in 1926 it was 69 per cent free, and in 1927 it was 82 per cent free. In 1926 they produced 280,000 bushels and in 1927 they had 370,000 bushels.

AGRICULTURE AND EDUCATION

Agricultural Education

The agriculture of New Jersey is served by several agencies which have aided materially in the development of the industry. Some of these are independent groups of persons interested in agriculture. Others are governmental agencies of organization, instruction, research, extension, and inspection.

The State Grange is one of the oldest farm organizations in New Jersey and has 17,000 members. There are 123 local or Subordinate Granges and 15 Pomona Granges organized largely along county lines.

The State Farm Bureau Federation, a branch of the National Farm Bureau organization, has a membership of 6,000. It is a federation of the local units known as County Boards of Agriculture which cooperate with the county agents of the Agricultural Extension Service.

Then there are numerous State-wide organizations representing special types of farming, such as the State Horticultural Society, Poultry Association, Cranberry Growers' Association, Dairymen's Association, Alfalfa Association, Potato Association, Beekeepers' Association, Association of Nurserymen, Farmers' Roadside Market Association, and Swine Growers' Association. There are also numerous organizations of farmers, such as the county poultry associations.

For the marketing of their products New Jersey farmers have 30 or more cooperative associations, among them the Jersey Fruit Growers Cooperative Association, South Jersey Farmers' Exchange, Monmouth County Farmers' Exchange, and Beverly Cooperative Association. Local branches of the Dairymen's League are to be found in the milk-producing sections.

The educational work centers around the State University at New Brunswick. Special service to agriculture began in 1864, when the Rutgers Scientific School was designated the State Agricultural College under the provisions of the Morrill Land Grant Act passed by Congress in 1862. Resident instruction is offered by the college in four-year courses leading to a bachelor's degree, in short winter courses, and in special unit courses. The college also conducts community short courses on special agricultural topics in different parts of the State.

At the Agricultural Experiment Station established in 1880 numerous research problems and investigations of agricultural matters are carried out. The Experiment Station has rendered valuable assistance to the farmers in the control of insect pests and plant diseases, in testing fertilizers, in studying soil fertility, in problems of feeding and breeding livestock, in developing varieties of fruits and vegetables, and in the control of poultry diseases. The station maintains a laboratory service for the

inspection and analysis of fertilizers, feeding stuffs, insecticides, milk-testing apparatus, seeds, and legume inoculants, thus protecting both the farmer and the honest dealer.

Another agency which renders valuable service is the State Department of Agriculture, with bureaus on animal industry, marketing, and statistics and inspection. The Bureau of Animal Industry supervises quarantines against animal diseases and works for the control of such diseases as bovine tuberculosis and hog cholera. It supervises the testing of dairy herds against tuberculosis and the official accrediting of tuberculosis-free herds.

The Bureau of Markets cooperates with farmers in the transportation and marketing of their products, gives advice on the organization of cooperative marketing associations, maintains a market reporting service, and supervises official market inspection. The Bureau of Statistics and Inspection gathers data on farm products and is in charge of the inspection of nursery stock for the control of insects and plant diseases. The State Agricultural Convention and Farm Products Show is held annually under the auspices of the State Department of Agriculture, at Trenton.

Cooperative Extension in Agriculture and Home Economics

The State Agricultural College of the University of New Jersey and the Agricultural Experiment Station are the headquarters of the Extension Service in Agriculture and Home Economics, conducted in cooperation with the United States Department of Agriculture and the several counties. Through this organization the services of the college and station are brought directly to the farmers and homemakers. There are agricultural agents in 19 of the 21 counties and home demonstration agents in 13 counties.

The University through this organization maintains close touch with the agricultural interests throughout the State. It distributes information on agricultural problems through visits of specialists, lectures before agricultural groups, an extensive correspondence, and the distribution of publications.

During 1926 these extension agents made

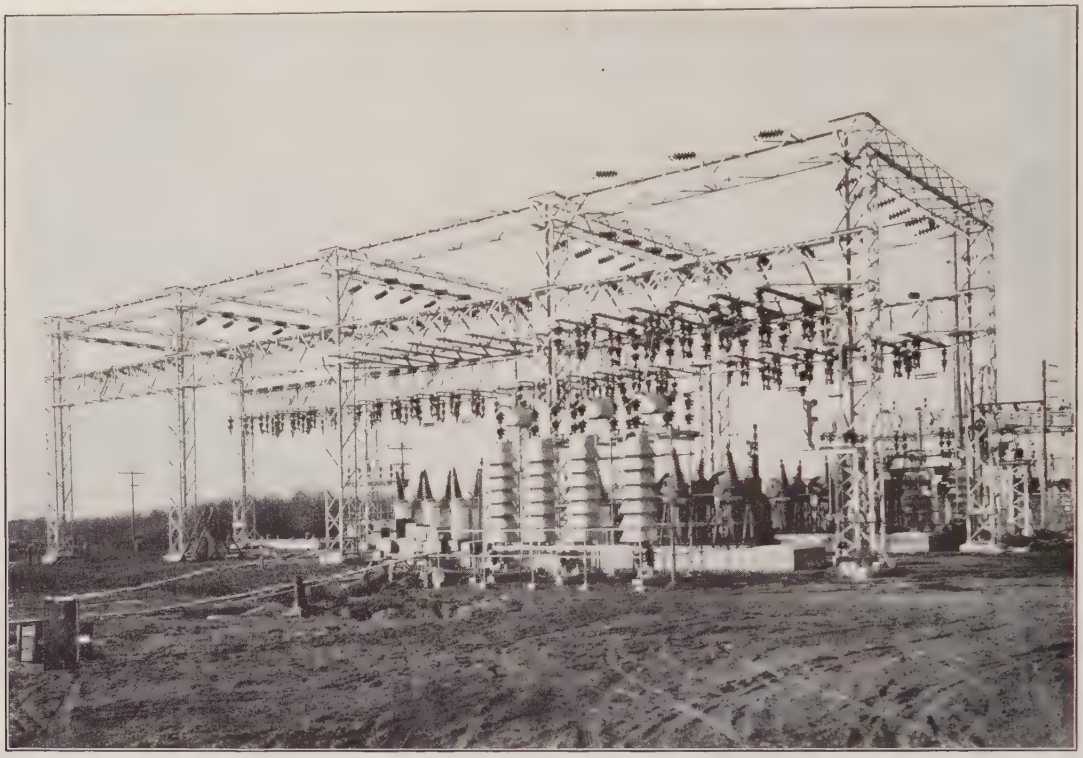
LUMBER WAITING TO BE MADE INTO HAMPERS AND BASKETS, BRIDGETON

ROADSIDE MARKET, FAIRTON

GATHERING RAW MILK IN GIANT THERMOS BOTTLES

HAYLOADER AT ROADSTOWN

MOORESTOWN COMMUNITY HOUSE AND GARDENS



WOODSTOWN SUBSTATION
Atlantic City Electric Company

28,887 calls on over 11,300 farmers. At 7,013 of these calls information was given on agriculture, and at 1,991 information on home matters. The number includes also homes of boys and girls enrolled in club work. The summer field day held annually at the College farm attracts several thousand visitors.

The Agricultural Experiment Station has branches in different parts of the State. Egg-laying contests are maintained by the poultry department at Vineland and Westwood, a cranberry substation is at Pemberton, and an oyster laboratory at Bivalve. Experiments with crops are held on individual farms chosen in different locations.

Another important phase is the instruction in agriculture in secondary schools. Nineteen of the New Jersey high schools now have departments of agriculture where vocational agriculture is taught along with the sciences fundamental to the industry. This work is administered according to the requirements of the Federal Smith-Hughes Act. Under this plan schoolroom instruction is supplemented with practical work on the home farm. The supervisor of agriculture under the State Department of Public Instruction is also Professor of Agricultural Education at the State University, where university students are trained for this special type of high-school instruction.

The agriculture of New Jersey has been passing through a transformation from the old general farm type to an industry of specialties, such as fruits, vegetables, poultry products, and milk. The intensive specialized agriculture gives rise to many problems where scientific research and a higher type of education are required. Under these circumstances the farmers of New Jersey have come to rely heavily upon the leadership of their State institutions and organizations.

Control Activities of the New Jersey Station

Several laws have been enacted during the past years to regulate the sale of materials used for agricultural purposes, for the protection of the consumer and the honest manufacturer;

PEACH BLOSSOM TIME AT DEL BAY FARMS, DEERFIELD NEAR BRIDGETON

and the New Jersey Agricultural Experiment Station has been given the authority to secure compliance. This form of service has always been one of its main activities.

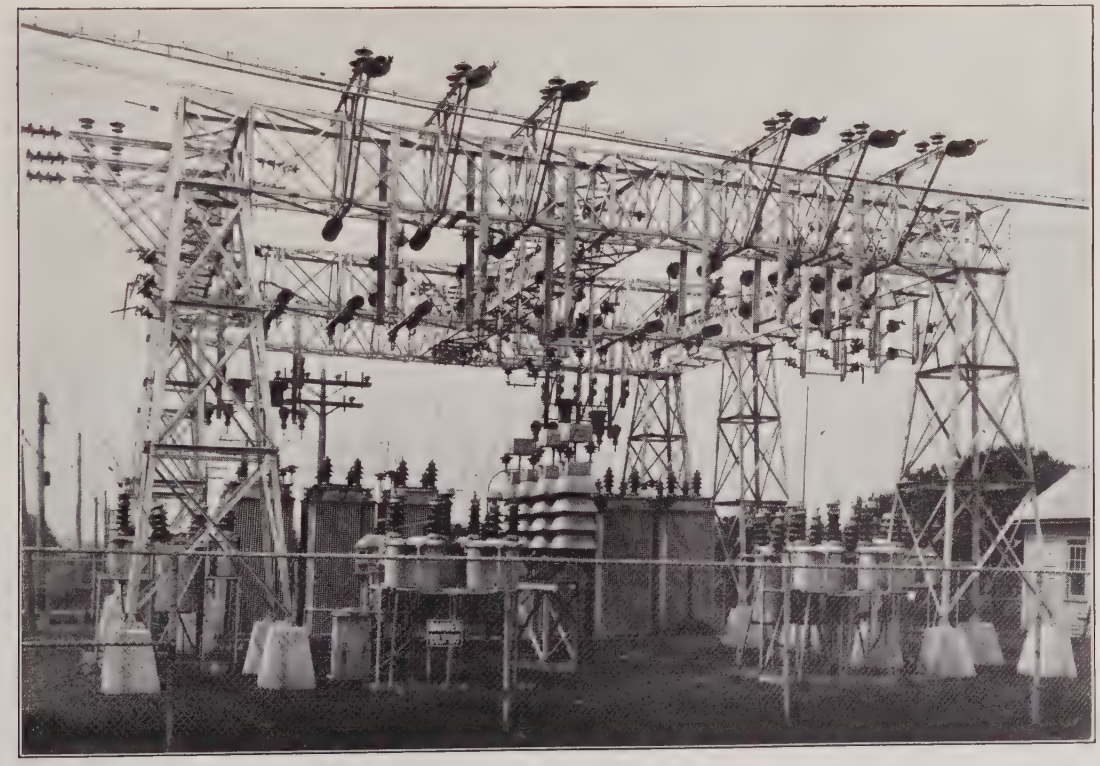
In the early history of the Experiment Station the only control law in force was the fertilizer law, but it was deemed necessary to regulate other products, and now there are laws covering the sale of agricultural lime, fertilizers, feeding stuffs, seeds. The necessity is apparent when many millions of dollars are spent annually for materials manufactured on a tonnage basis by parties who undoubtedly intend to deliver the material agreed upon, but who are confronted with many fluctuating conditions during the process of manufacture. The usual result is an improperly prepared product which may be the cause of a poor crop. There are also a few people who would attempt to sell a worthless product and would thus unfairly compete with the honest manufacturer.

The service which the Experiment Station is giving in the form of control work is in securing accurate information as to the composition of the materials on the market and in submitting the results of the examinations to those interested, in order that they may not only know the composition of any particular shipment, but that they can make the comparison with other similar products. This information is secured by trained inspectors who travel about and secure samples from actual shipments and also study the manner in which the guarantees are stated. The samples are examined at the laboratories and reports are issued. During the year several thousand samples are secured and examined.

Additional work is done that may be called special service. If a purchaser desires a report on a particular shipment, efforts are made to comply. Also when reports are received stating that the failure of a crop was due to materials purchased, the cases are investigated to ascertain the cause.

Seed Control

The seed control laboratory of the Agricultural Experiment Station was estab-



DEEPWATER SUBSTATION, DELAWARE RIVER NEAR PENNSGROVE
Atlantic City Electric Company

lished in 1912 for the purpose of governing the sale of seeds in the local markets. The law includes crop seeds and vegetable seeds sold in amounts of one pound or over.

The primary function of the laboratory is the inspection and collecting of samples of such seeds. Packages of crop seeds must bear the percentage of purity and germination and date of test; of vegetable seeds, the germination or growth percentage and date of test. Accordingly an inspection is conducted twice yearly, samples are gathered from every local market and analyzed, and reports are made to the vendors of these seeds. Dealers are advised by the reports whether the seed tests as labeled. If not complying with the law, the seeds must be withdrawn from sale. To date 181 towns have been visited, the stocks of 443 dealers inspected, and 1520 samples analyzed and reported.

Another valuable service is the analysis of seeds for residents. More than 3000 samples were tested annually, which means over 6000 analyses and more than 27,000 determinations.

FARMS OF DISTINCTION

Campbell's Soup Company

Campbell Soup Company farms, Nos. 1 and 2, containing 175 acres near Moorestown, Burlington County, are unique in that they are devoted to crop improvement work and crop service work. The first includes the originating and testing of new varieties and strains of vegetable suitable for canning, testing fertilizers, sprays and other blight and plant-disease repellents, trying out ideas and methods of soil preparation, the planting, spraying, picking, and transporting of canning crops, and in every other way improving their production or handling. The second is the growing and delivering of plants to the company's contracting growers, including the services of field men who are qualified experts.

Demonstrations are also conducted at the farms, which are clearing houses for information and advice on the growing of canning crops. The equipment includes an experimental laboratory and a hothouse for developing seedling plants. Thirty acres are covered with glass in hotbeds and cold frames for the tomato plants used by growers in 20,000 acres contracted for by the company locally. A system of overhead irrigation is used on the farms for field crop cultivation.

Much attention is given to producing new and improved strains of tomatoes, and several successful ones have been developed. The traits sought in the experimental work on tomatoes are proper color, size and shape; high specific gravity, acid content and sugar content; vigor of growth and disease-resisting characteristics; early bearing, free setting, and heavy fruiting qualities.

Del-Bay Farms

Del-Bay Farms at Bridgeton is one of the largest diversified farm properties in the East, operating with modern equipment 2000 acres of orchards and vegetables. While fruit and vegetables constitute the major portion of its products, the company also grows greenhouse roses. During the production peaks of July, August, and September, 700 employees are required, running to a low of about 150 during the winter months. The farm includes 1100 acres of orchards, with 46,000 peach trees and 70,000 apple trees; 1000 acres of vegetables, of which 250 acres have overhead irrigation from 36 miles of pipe; five acres of cold frames, and six greenhouses each 60 by 300 feet. All of this requires buildings and equipment rarely seen on a farm. A spur of the railroad carries the produce from the farm platforms to the city markets, while part of the crops is transported by auto trucks. A branch factory of the Snider Packing Corporation of Rochester, located on the farm, is an additional outlet for the company's crops.

There are a power plant, a cold-storage plant, an ice plant making 20 tons of ice a day, a packing house, garage, machine shop, stables, a hundred tenant houses, and 50 barracks. The

BROAD STREET, WOODBURY
A home center in the truck-gardening belt

equipment includes 43 trucks and automobiles, 10 caterpillar tractors, two wheel type tractors, nine small garden tractors, 14 gang plows, 12 power sprayers, three power dusters, 75 farm wagons, transplanters, vegetable washing machines, two-row potato planters, 60 horses and mules, and a stockroom containing 3800 items of hardware and supplies.

Employees' conferences and meetings aid in formulating the policies of the business. Heads of departments and foremen are called upon to discuss matters of production, marketing, and management. The company employs a cost accounting system, and the cost of every operation is known.

Riverview Farms

Riverview Farms at Bridgeton has 1000 acres under the plow, and this means 250 acres in asparagus, 50 acres in peach orchards, and the remainder in general farm and truck crops.

There are also 1000 acres in marshlands for the production of salt hays and muskrats. These areas are protected by heavy embankments, drainage ditches being cut inside them. The result is that the natural food supply of the muskrat is protected and increased, and the animals themselves encouraged to settle within these guarded areas. One acre of embanked marsh may produce more muskrat pelts than a hundred acres of wild marsh.

Riverview Farms employs 30 workers in the winter and 125 workers in summer. The investment represents $300,000. The volume of produce includes 15,000 crates of asparagus, 1,000,000 of asparagus roots, two to three tons of asparagus seed, 10,000 bushels of peaches, 1000 tons of fresh and salt hays, and the miscellaneous vegetables, such as tomatoes, peppers, beans, lettuce, cabbage, cauliflower, beets, carrots, eggplants, spinach, and strawberries—a total of 100,000 packages yearly.

Whitesbog

The first unit of the Whitesbog cranberry property was purchased in 1857 by James A. Fenwick, one of New Jersey's pioneer cranberry growers. Mr. Fenwick died in 1882 after

having developed about 40 acres of cranberry bog. There are now over 500 acres planted to cranberries on the property. For many years the only product was cranberries, but recently the production of blueberries has been added, 60 acres now being planted to blueberry plants.

The annual yield of cranberries at Whitesbog sometimes exceeds 15,000 barrels, and the yield of blueberries has exceeded 2,000 crates of 32 quarts each. The number of employees varies from about 20 in the winter to more than 300 when cranberries are being harvested. When the cranberries were all picked by hand the population of the village of Whitesbog sometimes numbered 1000 persons, but now that most of the cranberries are picked by machine scoops, fewer laborers are required.

Whitesbog has been developed almost entirely from the profits resulting from the culture of two indigenous wild fruits, consistently turned back into the improvement of the property by three generations of the same family.

Walker-Gordon

The Walker-Gordon Laboratory Company has two producing farms, one with 800 acres at Juliustown and another of 3000 acres at Plainsboro. The company specializes in milk for infant feeding, and the plant at Plainsboro has grown from a small dairy farm of 30 milking cows to over 1500.

The 3000 acres of farm land are used largely to grow feeds for the herd. Each year around 800 acres of corn is raised for ensilage, and from 200 to 400 acres of alfalfa.

This farm is also making a commercial attempt to dry forage crops artificially, and has installed a mechanical hay-drying apparatus which receives the alfalfa green from the field and dries, grinds, and bags it ready for feeding.

The producing plant is operated separately from the farm. Men who care for and feed the cattle and perform different operations in the barns do that work and nothing else. About 300 men are employed in the producing plant and 25 on the farms.

CONCRETE SHIP BUILT DURING WORLD WAR
Sunk off Cape May Point to serve as a breakwater

Chapter VI

Public Utilities

WATER

Water as a necessity of life and its availability when required are taken for granted to such an extent that few think of anything except the mechanical act of turning the faucet. Annoyance first and then consternation would follow the continued failure of water to flow through its customary channels. It is a far cry from the occasional Indian wandering by the forest stream to the time when every man had his own well by his dwelling, and on to the present, when water must be furnished in enormous volume to great centers of population for domestic use and for a multitude of industrial purposes. The problem is complex but can be solved satisfactorily if dealt with on broad lines and with the co-operation of all concerned.

The total consumption of water from public systems, both publicly and privately owned, in New Jersey during 1924 was over 354,000,000 gallons daily. Of this 101,500,000 gallons daily was ground water taken from a large number of artesian wells. For convenience in considering water supplies, New Jersey may be divided into three parts.

First, the Northern Metropolitan District, comprising roughly the counties of Bergen, Passaic, Essex, Hudson, Union and Middlesex.

Second, the Southern Metropolitan District, comprising the counties of Mercer, Burlington, Camden and Gloucester, including the cities of Camden and Trenton.

Third, the rest of the State.

Northern Metropolitan District

In the Northern Metropolitan District reside 2,360,000 people, or 68% of the total population of the State, in about 175 incorporated communities. Nearly all are supplied from 40 water systems, of which 22 are publicly and 18 privately owned. They consumed in 1924 about 250,000,000 gallons daily. The principal developed sources are the following: (1) The Pequannock watershed of 64 square miles, from which Newark draws a maximum of 57,000,000 gallons daily; (2) The Rockaway watershed of 121 square miles, which furnishes Jersey City with 60,000,000 gallons daily, a part of which is sold to neighboring cities, (this supply, with additional storage, can be increased to 100,000,000 gallons daily); (3) the Passaic River (main stream at Little Falls), from which the Passaic Consolidated Water Company takes some 50,000,000 gallons daily for sale to Paterson, Passaic, Clifton, Kearny, Harrison, East Newark, and Bayonne;* (4) the Hackensack shed of 115 square miles (partly in New York State) from which the Hackensack Water Company supplies between 26,000,000 and 30,000,000 gallons daily to Union City, Guttenberg, Weehawken, West New York and Secaucus in Hudson County, besides Hackensack, Englewood and some 40 other communities in Bergen County; the sources used by the Elizabethtown Water Company, the Plainfield Union Water Company and the Middlesex Water Company, which include the Elizabeth and Rahway rivers and a large number of wells located at different points. These companies supply some 35 communities in Union and Middlesex Counties with about 26,000,000 to 27,000,000 gallons daily. The Commonwealth Water Company supplies about 8,000,000 gallons daily to Summit, Irvington, West Orange, Millburn, Maplewood and other places. Perth Amboy secures 14,000,000 gallons daily from wells and

*Note:—Some of these cities will share in the Wanaque supply referred to later.

WANAQUE RESERVOIR
Lookout south from intersecting concrete bridge

WANAQUE RESERVOIR
Looking north from same point. When filled, the reservoir water will be up to the line of trees shown in these views

New Brunswick about 7,000,000 gallons daily from Lawrence Brook.

Southern Metropolitan District

In the Southern Metropolitan District there were 542,000 people (16% of the total population) in some 105 incorporated communities. Nearly all were supplied from 48 public water systems, of which 19 were publicly and 29 privately owned. They consumed about 84,000,000 gallons daily. Trenton has an unlimited supply from the Delaware River, the chief problem being to prevent pollution from streams flowing into the Delaware and from other sources. Camden has developed a supply of over 16,000,000 gallons daily from underground sources, and the remainder of the district derives its supplies mainly from wells in a similar manner.

Rest of the State

The rest of the State has an area of about double that of the two metropolitan districts combined, but contains only about one-sixth of the population and is predominantly rural. There are, however, 250 incorporated communities, but they are generally small and widely scattered.

Population Growth

The growth of the population is reflected proportionately in the need for additional water supplies. Those best qualified to judge estimated the population of New Jersey in 1924 to have been 3,044,000, and that by 1930 it would be 3,463,000, with a further increase by 1940 to 4,219,000. The census bureau now estimates the population of the State, as of July 1, 1928, to be 3,821,000, or 358,000 more than was anticipated by 1930.

Increasing knowledge of New Jersey's many advantages for industrial, commercial and residential purposes, the facilities afforded by the Holland Tunnel and bridges between New Jersey and New York, and by the Delaware River bridge connecting Camden and Philadelphia, combine to produce this exceptionally rapid growth, which is but the beginning of a still greater influx. These facts give added emphasis to the necessity for the development of new sources of water-supply, especially in the Northern Metropolitan District.

New Sources of Water Supply

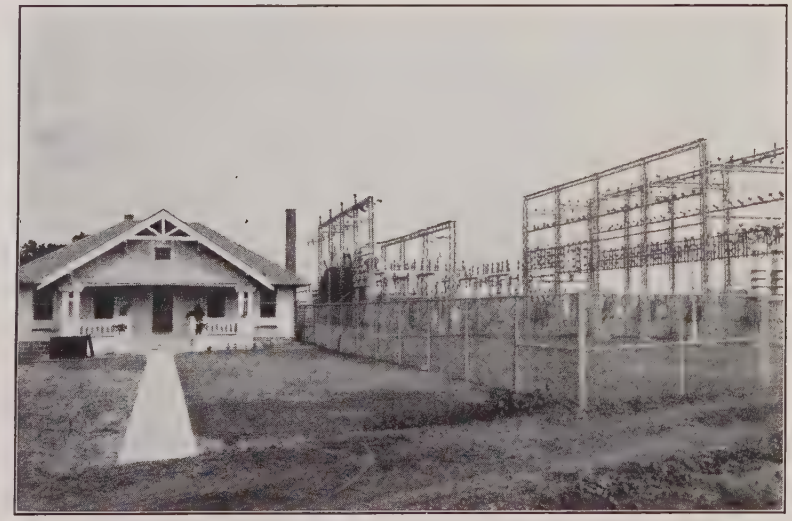
In this district the margin of safety between daily consumption and the maximum average capacity of developed supplies is very narrow and may disappear entirely in the first dry season, such as was experienced in large areas in 1918 and again in 1923. Furthermore, increasing pollution in some of the sources in thickly populated districts will render desirable, and even imperative, the abandonment of these supplies as soon as they can be replaced with purer water. Filtration and chlorination are already resorted to extensively, but there is an undetermined limit beyond which it would not be prudent to go in this direction.

A factor of very great importance in the northern district is the approaching completion of the development of the Wanaque watershed, adjoining that of the Pequannock, with an area in New Jersey of about 66 square miles. The city of Newark, anticipating future needs, very wisely, and after a long period of preliminary consideration, entered into a contract with the North Jersey District Water Supply Commission on October 31, 1918, for a supply of 50,000,000 gallons a day from the Wanaque River. The project was later enlarged to provide for a supply of 100,000,000 gallons daily and to make possible the participation of other cities under a supplementary contract with Newark, dated January 24, 1924.

Meanwhile, the drought of 1923 had alarmed a number of adjacent communities and negotiations were entered into which finally resulted in contracts between the city of Newark and the commission with the cities of Paterson, Passaic, Clifton, the towns of Kearny, Montclair, Bloomfield, and the Borough of Glen Ridge. Under this arrangement the needs of these communities will be met for a reasonable period and Newark, which will have an allotment of 40,500,000 gallons daily, will be in a position for a few years to aid other cities until its own needs require the use of its full share. One example of this is the city of Elizabeth, which is negotiating with Newark for the inter-connection of the distributing

LAYING TELEPHONE CABLE UNDER HACKENSACK RIVER

OAK HILL RESERVOIR
Part of North Jersey District water supply system



BRIDGETON SUBSTATION
Atlantic City Electric Company

GIANT GAS HOLDER AT HARRISON
Public Service Electric and Gas Company

WANAQUE DAM
Wanaque-Midvale in the valley at the right

systems, so as to render possible the use of Wanaque water to supply its needs.

The Wanaque project, as finally planned, provided for the acquisition of about 6,000 acres of land and the creation of a reservoir with a water surface, when full, at an elevation of 300 feet above sea level. This is 200 feet above the level of the business centers of Newark, Paterson and Passaic. The reservoir, which has been completed, is about six miles long and a little less than a mile wide at the widest point. When full, its average depth will be about 37 feet, and its total storage capacity at the normal overflow level will be 27,600,000,000 gallons.

It was necessary to construct eight dams with an aggregate length of about one and one-half miles. The largest of these, the Wanaque dam, is an earth structure 1500 feet long with a concrete core wall in the center, extending from the flow line down to bedrock. Relocation of the Erie Railroad for six miles, and of highways for eight miles, has been necessary. The aqueduct from the reservoir will be about 21 miles long. Except for the tunnel through Watchung mountain, little work has been done on this part of the undertaking, which will probably require two years for completion.

The total cost of the entire project will amount to some $26,000,000 to $27,000,000, apportioned among the participating communities. The supply thus furnished will, even if supplemented by local projects and the interchange of existing supplies, enable the Northern Metropolitan District to meet its needs adequately for only a few years.

The Hackensack watershed is susceptible of further development and the Hackensack Water Company now contemplates the erection of a dam at Rivervale, Bergen County, near the New York State line, which would make possible a substantial increase in the supply available from that source.

The Ramapo River watershed includes 147 square miles but about 112 square miles of this area are in New York State. This is susceptible of development, which would produce

some 70,000,000 gallons daily, available for Bergen and Hudson Counties.

It must be borne in mind, however, with respect to both the Hackensack and Ramapo that, since these streams rise in New York State and a substantial portion of their catchment areas are in that State, full development is impossible without joint action, which of necessity would include provision for certain New York communities. Another fact of growing importance is the increasing density of population in Bergen County, which will make it more difficult in future to keep supplies from these sources sufficiently free from pollution to warrant their use for potable purposes.

In view of the situation thus outlined, it is necessary, either through action by the State of New Jersey or by a cooperative movement on the part of all interested communities, to plan at once for the next major development.

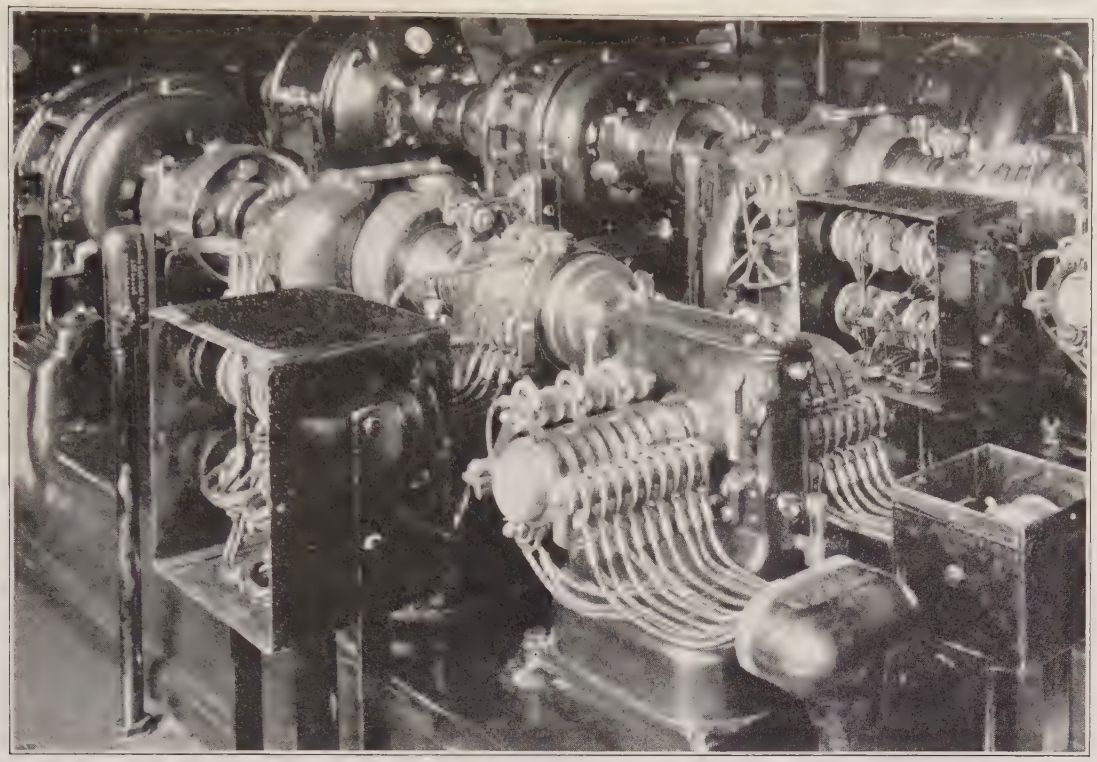
A substantial supply may be obtained from the North and South Branches of the Raritan River, but the ultimate solution of the problem for the Northern Metropolitan District is to develop the streams in the sparsely settled highlands in the western part of the State, all of which flow into the Delaware River.

New York and Pennsylvania, as well as New Jersey, have inalienable rights in the great Delaware basin, which contains about 7,000 square miles above Trenton Falls. It is highly important, therefore, in order to avoid endless litigation in future, to arrive at some equitable understanding among all three States. Two attempts have been made to accomplish this result and one treaty negotiated by commissions representing New Jersey, New York and Pennsylvania, is now in the hands of the legislature for consideration.

Several State bodies have jurisdiction over various phases of the water problem. Chief among these are the State Department of Conservation and Development, and North Jersey District Water Supply Commission. The Water Policy Commission was created by the legislature for the purpose of investigating and reporting upon various phases of the question as it affects the welfare of the entire State.

"CUBORE"

First American-built and successfully operated ship equipped with Diesel oil engines. Docked at Claremont Terminal



GENERATORS THAT FURNISH THE POWER FOR RINGING THE TELEPHONE BELLS AND FOR COLLECTING AND RETURNING COINS IN PAY STATIONS
South Orange office, New Jersey Bell Telephone Company

NEW BRUNSWICK OPERATING ROOM
New Jersey Bell Telephone Company

NEW 20 STORY HEADQUARTERS OF THE NEW JERSEY BELL TELEPHONE COMPANY, IN NEWARK

Will house all of the administration and management staff, and their assistants, numbering 3,000 of the 15,000 employees of the company. Designed in free, American style without interruptions to the tall lines straight to the top of the building. Across the front there are six sculptured figures by Edward McCartan, representing linemen, plant workmen, switchboard operators and subscribers.

TELEPHONE

The company or individual that contemplates establishing itself in New Jersey practically can eliminate from its calculations the problem of adequate telephone service. More telephones are in use in New Jersey than in any one of 38 other states in the country, and the telephone industry is developed in adequacy and speed of service to a point where inter-community and interstate calls are nearly on a par with local calls.

The strategic position of the State between the cities of New York and Philadelphia has led to the provision of telephone facilities of the highest order into both cities from any point in New Jersey. Direct lines radiate to many other cities the country over, from the principal manufacturing, industrial, commercial and residential sections of the State.

The extent to which the telephone is used for the speedy transaction of business is indicated in more than 760,000,000 calls made yearly by New Jersey people from more than 620,000 telephones. About 120,000,000 of these calls are to points outside the State and originate in the 3,000,000 miles of telephone line in the system of the New Jersey Bell Telephone Company, the associated company of the Bell System in New Jersey, which owns all except three per cent. of the telephones in the State and handles 90 per cent. of the telephone business.

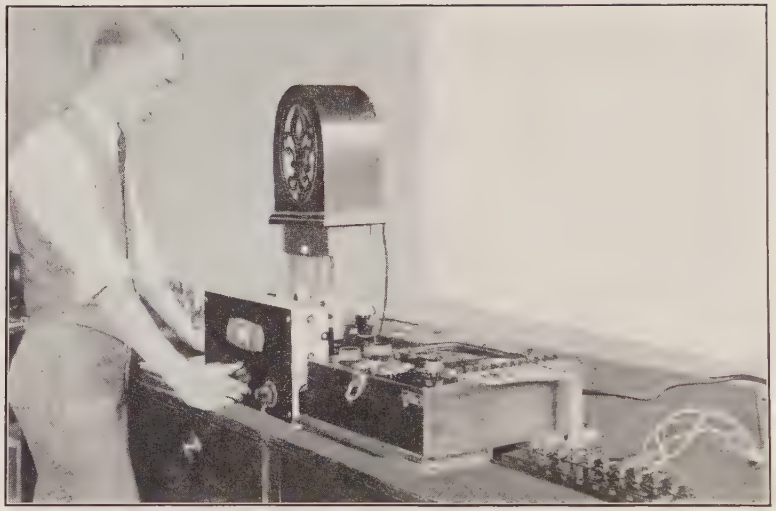
This company, in common with the rest of the Bell System, has pledged itself to furnish the most telephone service and the best, at the least cost to the people of the State; to seek no large profits for distribution as "melons" or extra dividends; and to use any earnings in excess of actual requirements to improve the service, or else to reduce rates. In New Jersey this means a constant improvement of telephone service already of high standard. When improvements are possible, they are quickly made, especially in the provision of faster and more accurate handling of calls to nearby communities and to towns at great distances. Within recent years the time required to complete toll and long distance calls has been greatly reduced.

Industrial and residential expansion in New Jersey has been rapid in recent years. The robust growth constantly challenges the telephone industry to keep pace, but it has promptly met the demand for additional facilities. In order to do so the rate of growth of the industry measured in terms of new telephones alone has been more rapid at times than anywhere else in the country. In meeting the task of keeping pace with New Jersey's development, the New Jersey Bell Telephone Company is spending annually some $25,000,000 for new construction, an outlay made in accordance with carefully prepared and annually revised forecasts of future telephone needs. The capacity of the industry to provide adequate service, even if the demand exceeds the forecasts, is limited only by the national resources of the Bell System.

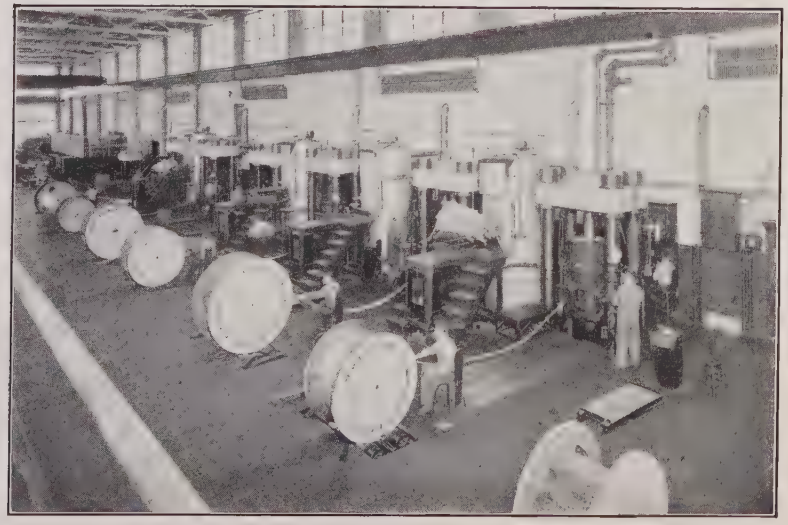
The rural nature of a large part of the State outside its great cities is yielding steadily to metropolitan conditions in two big areas north and south. A steady influx of new residents and new business enterprises into these areas has been given tremendous acceleration by such projects as the bridges and vehicular tunnels connecting New Jersey with New York in the north, and the great bridge between New Jersey and Pennsylvania over the Delaware at Camden in the south. Local and sectional boundaries and interests are dwindling in these areas and being supplanted by the idea of single large communities of metropolitan interests. This is an attitude the telephone industry recognizes and shapes its efforts to meet by offering new types of service providing larger calling areas. This extension of service is given as part of a schedule which provides telephone facilities for a wide range of individual needs, offering a choice of the most convenient form for specific needs at the most economical rate for the use to be made of the telephone service.

The parallel developments of the State and the industry during the last half century have been interdependent to a large degree. Urban and rural life in New Jersey as it exists now is

PUBLIC SERVICE MAIN OFFICES, NEWARK



DETERMINING CLEARNESS OF RECEPTION—KOLSTER RADIO



MAKING LEAD-COVERED TELEPHONE CABLE
Western Electric Company at Kearny

MAKING SUBMARINE TELEPHONE CABLE
Western Electric Company at Kearny

possible because of the telephone, to as large a degree as the great office buildings in the State's cities. And in turn the telephone industry in the State has achieved its size and importance because it is a necessity for the communication needs of a constantly growing state.

The people of New Jersey only recently have been served by one state-wide service with modern plant under a single operating control. For a number of years prior to 1927 the industry was largely maintained by two separate organizations, the New York Telephone Company in the northern and central parts of the State, and the Delaware and Atlantic Telegraph and Telephone Company in the southern. In 1927, because of the size of the existing telephone systems and the expectancy of their continued growth, it seemed desirable to create the single organization with a single management which could devote its entire efforts to the increasingly complex problems of providing telephone service for the people of the State. Merger of the two properties was approved that year by the State Board of Public Utility Commissioners.

How great and complex is the problem which prompted the merger can most readily be seen from records of telephone growth. These show that from 1878, when telephone history in New Jersey commenced, to 1890, the average gain in telephones in the state yearly was 470; from 1890 to 1900 about 3,600; and at present more than 40,000 a year, or almost 100 times the annual average growth up to 1890. In 1900 there were 5.6 telephones per square mile of New Jersey territory. In 1928 there were 78.5 —a hundredfold increase in telephones while population has only slightly more than doubled, from 250.7 persons per square mile in 1900 to 550 in 1928.

Telephone history on a commercial basis in New Jersey began in 1878 in Monmouth County, where the Bell Telephone Company of New York began furnishing service, and in Newark and Passaic in 1879 when the Gold and Stock Telegraph Company started operations.

GAS

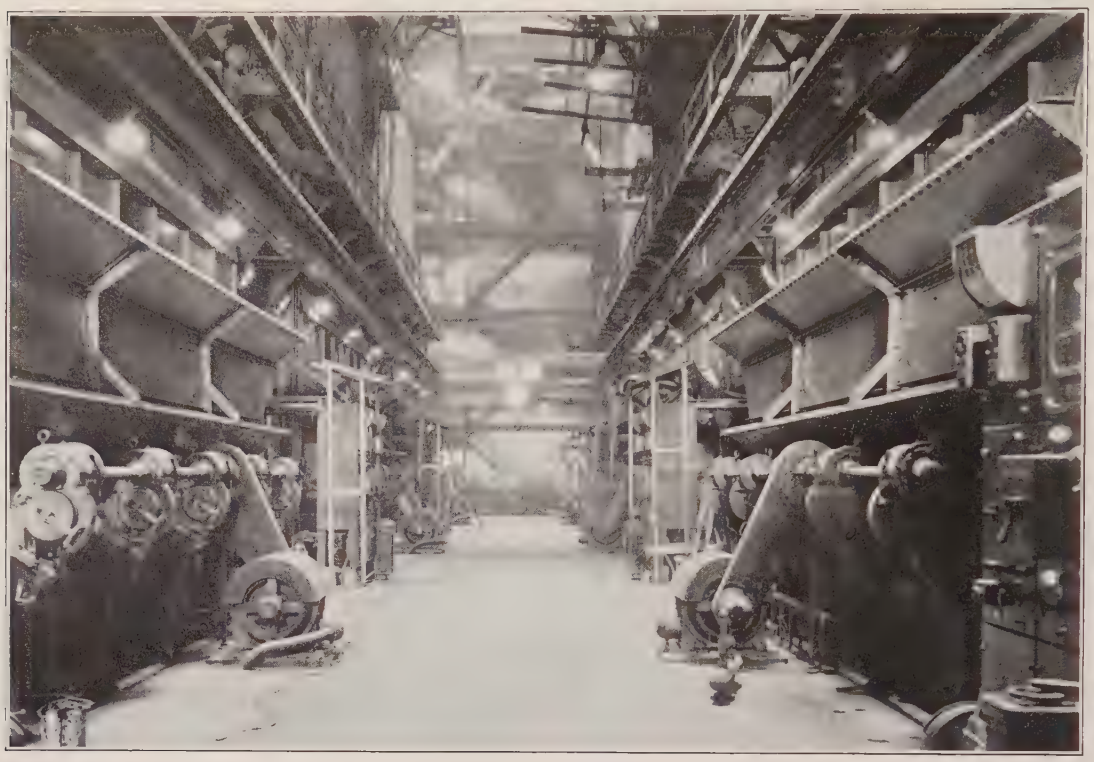
In an industrial state, gas, either natural or manufactured, is an absolute essential. Its manufacture, sale, and distribution constitute one of the oldest of present-day public utility services. Although gas for balloon purposes had been produced in the Eighteenth Century, it was not until the early part of the Nineteenth Century that this product came into use for illumination. While apparently the earliest developments must be credited to English and Scotch investigators, we find that New Jersey was not far behind in this development. The first gas-works in America was also the third in the world. It was preceded only by those in London and Liverpool. It was established in Baltimore in 1816.

This was the result of the spirit of investigation and progress of Rembrandt Peale, the artist, who in 1813 illuminated his museum and gallery of fine arts in Holliday Street, Baltimore, by gas produced in a home-made gas making machine. Everybody in Baltimore, including the city fathers, was interested, and in consequence there was little difficulty in securing the passage in 1816 of an ordinance permitting Peale and his associates to manufacture gas and to contract with the city for lighting the streets. Thus it came about that an artist, and not a business man, became the first of the so-called public utility "magnates" of the country.

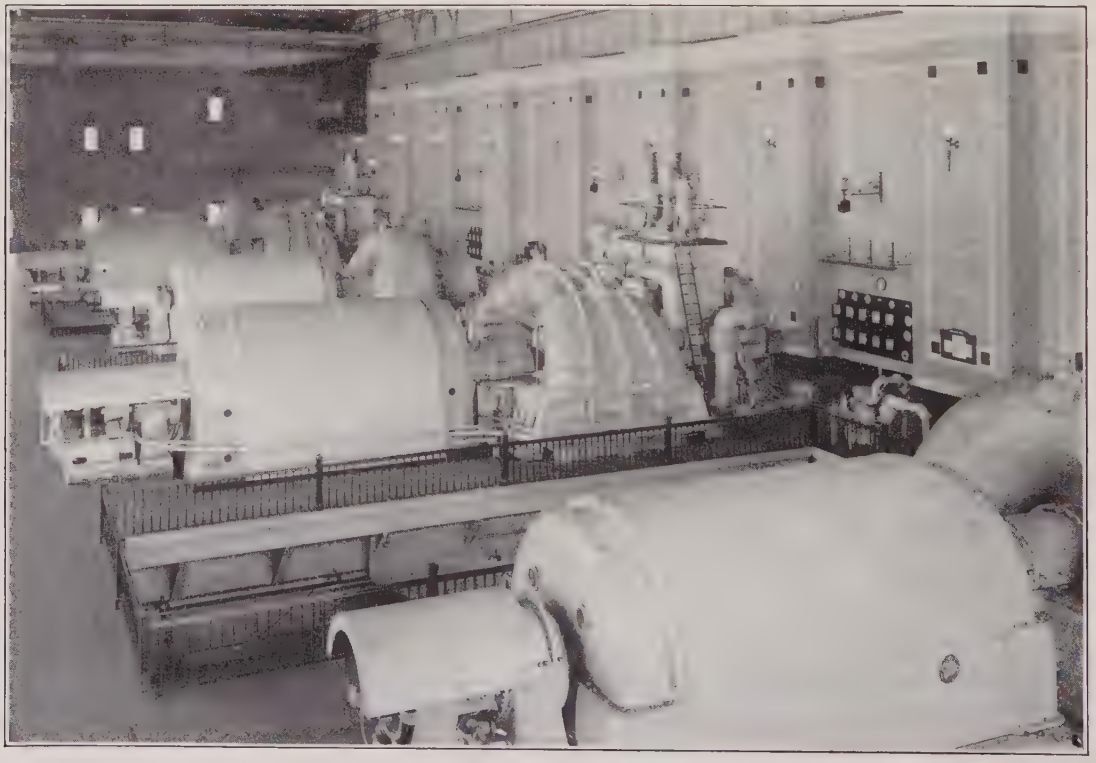
As first produced, gas was not only expensive, but was of far less value than today's product. Furthermore it was a source of danger to walls and pictures owing to the products resulting from its combustion. Pressures were low and the area that could be served from a single plant was restricted. It was only about 20 years ago that the distribution of ordinary gas at higher pressures was taken up, and today every community of any size in New Jersey is supplied with manufactured gas at rates commensurate with the cost of production in the different areas.

In addition, gas is available in many rural sections. It is distributed at high pressure with individual house governors. At the present

TWO EXTREMES OF ENERGY



COAL TO STEAM
Public Service power plant boiler room at Kearny



STEAM TO ELECTRICITY
Turbines of Public Service at Kearny

time about 600 miles of high-pressure gas mains are in service along country roads. The rates charged for gas have resulted in considerable development of industry where this fuel is used for tempering and other heat-treating processes. One notable use, although not very extensive of course, is in the manufacture of glass eyes, there being two such factories in the northern part of the state using gas in this operation.

This ideal fuel is also extensively used for house heating owing to the elimination of problems involving storage and the handling of coal and ashes. Gas heating at the seashore, where there is ample unused capacity in the winter time, has had a rapid development. The State, of course, cannot offer the same low rates as are available where natural gas can be had, but the production of gas by the larger companies is on such a scale as to compete favorably with similar operations in other parts of the country. This has resulted in the use of gaseous fuel in large quantities by many manufacturing plants which require heat in their industrial processes.

ELECTRICITY

In an industrial community power is one of the foundations on which success is built. Much of the history of the development of electric power was enacted in New Jersey. The Edison dynamo, an important element of the first successful direct-current system, the Sawyer-Mann incandescent lamp, the Weston motor, the Daft electric railway system, and the Edison electric meter were all developed and first put in use in this State. At Mr. Edison's laboratory at Menlo Park were conducted many of the early experiments in connection with the development of the direct-current dynamo, the incandescent lamp, the street railway motor, and the Edison electric meter, in which the principle of electro-deposition was used to determine the amount of current which had passed through the circuit.

All of the early electrical generators were quite small in capacity, so small in comparison with the capacity of the engines, that in many plants a single engine, through the medium of a line-shaft, was utilized in the driving of a large number of generators. The first electric lighting, principally used for lighting streets and stores, was by the use of arc lamps, and very soon afterwards by incandescent lamps. Both were operated by means of series circuits, each circuit being supplied by its own independent generator.

Between 1890 and 1900 the development of electric illumination was literally astounding, and New Jersey had its part in this advance. The State profited greatly and today electrical energy is available in nearly every community. High-tension transmission of electrical energy now supplies the most remote portions of the State. There are still a number of rural areas not supplied, but the electric companies are rapidly spreading their distribution lines over all remaining areas where the business available justifies.

The era of the small generating plant has passed, and service is supplied by less than a dozen companies, most of which are so interconnected that it is safe for an industry to locate its plant in almost any part of the State with an assurance that there will be a relatively unlimited supply of electric power at reasonable rates. Because of the high-tension transmission lines and minor interconnections between the various companies, it is no longer necessary to confine industrial development to the vicinity of the large cities.

For many years it has been the practice to locate small factories in villages and small towns in order to utilize labor which would otherwise have to move to the larger cities. Today the power question need no longer influence the choice of location for an industry. The interconnections, sometimes referred to as the "superpower" system, which are being made between the different companies, include all the adjacent states.

For upward of two years the cables of the Philadelphia Electric Company have brought power into the City of Camden and vicinity. In October, 1927, the Trenton switching sta-

PENNSYLVANIA FERRY TERMINAL AT CAMDEN

MADISON STATION OF THE LACKAWANNA

MORRISTOWN STATION OF THE LACKAWANNA

BRICK CHURCH STATION AT EAST ORANGE, LACKAWANNA

tion of the Public Service Electric and Gas Company was put into service at a cost of $1,500,000. Through it Public Service receives power from the Philadelphia Electric Company for the supply of Trenton and vicinity. This power is received at the present time at 66,000 volts. The line itself, however, is designed for 132,000 volts. The capacity of the line is 50,000 kilowatts and when necessary can be readily doubled.

A thoroughly modern plant has been constructed in Kearny. It has an ultimate capacity of 450,000 kilowatts and it is operated as part of a group which includes the Essex power station, Newark, and the Marion power station, Jersey City. Combined, these three plants have about six times the dependable, continuous capacity of the much-talked-of Muscle Shoals plant in its present stage of development.

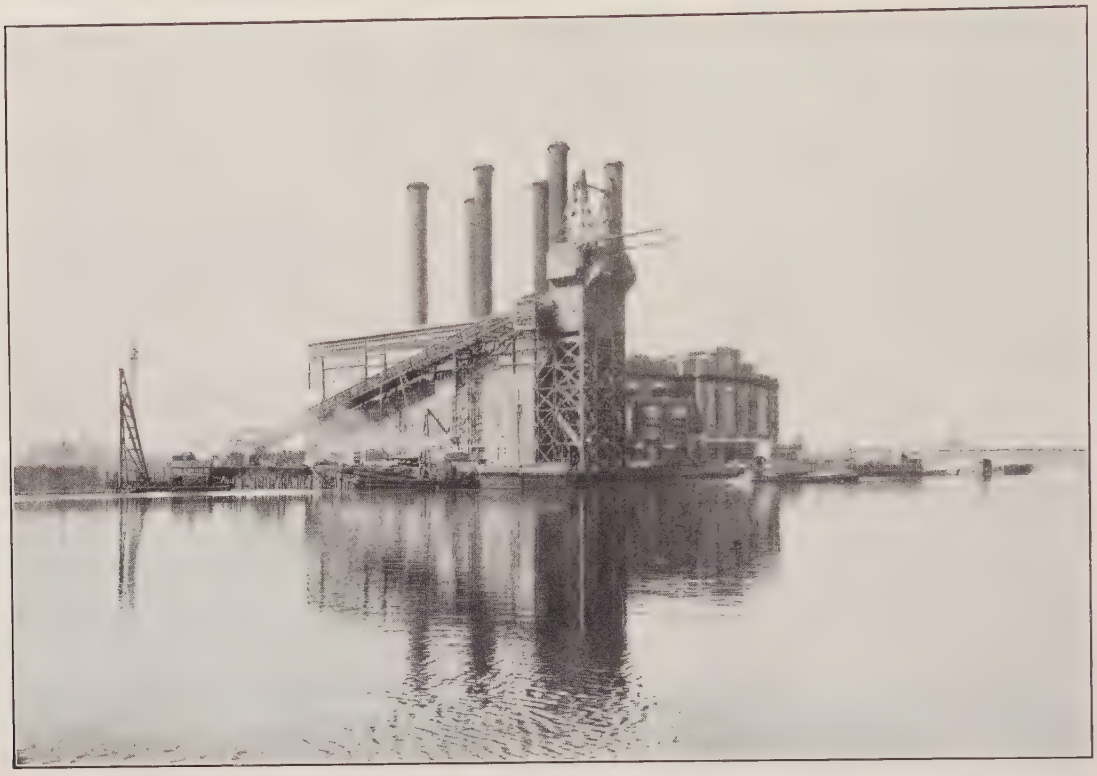
Connecting this group of plants with a switching station at Athenia, midway between Paterson and Passaic, a switching station at Roseland, several miles west of Newark, and extending to the southward, southeastward, and thence toward the east to a point south of Metuchen, is a two-circuit transmission line operating at 132,000 volts, tying together all of the large power stations in the northern part of the State. Construction of a new power station is to be commenced at a point near Perth Amboy where ample water and fuel are readily available. Later 132,000-volt connections are to be established, if possible, from the Metuchen switching station to the Kearny switching station along Newark Bay and the Passaic River and thus making a complete loop connection for the northern section.

Utility companies have recognized for a long time the general principle that full cooperation is best for all concerned. This has led to an agreement between Public Service Electric and Gas Company on the one hand, the Philadelphia Electric Company on the southwest, and the Pennsylvania Power and Light Company on the northwest, for a pooling of the resources of the three companies. In order to make this effective a "ring" is under construction, including an 82-mile transmission line from Siegfried, Pa., eight miles north of Allentown, to the Roseland switching station, where connections will be made with the 132,000-volt lines already referred to; a 49-mile line from Siegfried to a switching station near Philadelphia, where connections will be made from the Conowingo hydroelectric plant on the Susquehanna River and the other stations of the Philadelphia Electric Company; and the Roseland and Philadelphia stations will be connected by a 77-mile line, thus completing the loop, into which will feed all the generating stations of the three companies.

The work of constructing these transmission lines will be completed in 1930 at a cost of approximately $26,000,000. The net result of this pooling of interests will be a saving of $3,000,000 per annum because of economies effected. The principal advantage which the interconnection of these systems is expected to achieve is improvement in service, especially as to dependability. In addition there will be benefits arising from diversity of load, the possibility of staggering construction programs, and the ability to concentrate production in the most efficient generating plants, irrespective of ownership. The diversity factor alone has a very important effect in reducing the combined needs of the system.

The total capacity of all the plants feeding into this pool will be approximately 2,250,000 kilowatts. Other plants than those mentioned which will be connected with this system are, first, a plant at West Pittston with a capacity of 66,000 kilowatts, owned jointly by the American Gas and Electric Company and the Pennsylvania Power and Light Company; and a plant to be located at Sunbury on the Susquehanna River, which will be connected to the Siegfried switching station.

In addition to the connections now partly established and being completed by Public Service Electric and Gas Company, the plants at York Haven and Middletown on the Susquehanna River; at Reading and Easton, Pa.; and at Dover, New Jersey, are all connected by means of 110,000-volt transmission lines extending from the Susquehanna River through western and northern New Jersey to Walden, New York, where connections are made with the Adirondack Power Company. Through



MAIN GENERATING PLANT, ESSEX STATION—PUBLIC SERVICE

PUBLIC SERVICE POWER PLANT AT KEARNY

these various interconnections the entire country from Boston to Pensacola and to Chicago may be connected at any time for emergency purposes, and in fact, was connected for a temporary test in June, 1927. At Holland, on the Delaware River, a few miles above Frenchtown, a modern power station operated at a steam pressure of 1,200 pounds, is under construction. This will be connected directly to the 110,000-volt line referred to.

The entire portion of the State south of Barnegat City on the east and a point a few miles south of Camden on the west is served by the Atlantic City Electric Company. Here is a large area for potential industrial development, surrounded by deep-water shipping facilities, and interlaced by an extensive transportation system.

The Atlantic City Electric Company's management is already preparing for the development of this territory. From east to west the State is spanned with two principal 66,000 volt lines both of which originate at Deepwater Point on the Delaware River opposite Wilmington, Delaware. After diverging to Hammonton on the north, and through Bridgeton and Ocean View on the south, they come together again at Atlantic City. Radiating from these trunks are other transmission lines, which cover the territory with a complete network of 300 miles of line.

There is now under construction still another double-circuit steel tower 132,000 volt line to be run in a straight line from Deepwater Point to Atlantic City. This line is 56 miles in length and will be constructed at a cost of nearly a million dollars.

In addition to its own facilities, now installed or under construction, the Company has provided for supplementary sources of supply to take care of breakdowns or other emergencies. At Deepwater Point submarine cables connect with the system of the United Gas Improvement Company, including the Philadelphia Electric Company's steam plants and Conowingo Hydro-Electric Plant on the Susquehanna River. A connection with the West Jersey and seashore transmission lines makes available other sources of supply.

Although the plant capacity of the Atlantic City Electric Company of 80,000 horse power is ample to take care of immediate load necessities, the anticipated growth of southern New Jersey is so great that the company is now engaged in the construction of a new plant at Deepwater Point. This plant will have an ultimate capacity of 575,000 horse power, of which the first unit of 160,000 horse power is now being installed at a cost of $12,000,000.

It embodies all of the most modern elements of power plant construction for the production of electric energy at the lowest possible cost. The boilers will have a working pressure of 1350 pounds and the high-pressure turbines will operate at 1200 pounds pressure.

The plant has an ideal strategic location, being at the center of the anticipated load, and immediately on the Delaware River where there are unlimited water supply and deep-water shipping facilities. Coal may be unloaded directly from ships or barges as well as from direct railroad connections.

An unusual feature of this plant is the provision for the sale of steam to the Du Pont Company for its dye works. So certain is the Company of the location in the immediate vicinity of manufacturing plants using process steam, boiler capacity has been provided and large tracts of land for such plants have been purchased in the neighborhood of Deepwater Point.

Industry in New Jersey need not lack ample supplies of power at reasonable rates. Charges for electrical energy must of course be based upon cost, but owing partly to the interconnection with the various companies, rates have been reduced in the last few years, for both power and ordinary household uses. This has encouraged the installation of labor-saving household devices on a widespread scale.

HOBOKEN TERMINAL—PUBLIC SERVICE ELECTRIC LINES

TYPICAL BUS BARN OF PUBLIC SERVICE

ELECTRIC CAR AND MOTOR BUS SERVICE

Because of the way in which its population is distributed throughout many municipalities, which, though politically separated, are bound together by common commercial, industrial and social interests, adequate and dependable local transportation service is extremely essential to New Jersey's welfare. The northern section of the State demands the finest possible communication with the neighboring city of New York, and a similar demand for communication with Philadelphia is present in the southern part of the State. In addition, each of the major cities of New Jersey is a nucleus around which cluster residential and industrial communities, whose growth and progress require the high development of transit facilities.

While few other states have so great a need for local transportation service, it is also true that nowhere else has such a widespread system of local transportation been developed. Before the advent of the motor bus as a common carrier, one of the largest and most comprehensive street railway systems in the world provided communication for New Jersey's many communities and played a major part in their growth and upbuilding.

This street railway system, which embraces some 875 miles of track, still constitutes the backbone of the service, meeting the need for mass transportation in the larger population centers. It has been augmented by a veritable network of bus lines, which, radiating into suburban territory, supplementing street-car facilities, connecting outlying districts, traversing the State to supply interstate facilities, and providing a new and more luxurious form of transit, have strengthened, extended and improved in very great measure transportation resources.

The adoption by the larger local transportation companies of the motor bus as an auxiliary to rail transportation, has not only given to its operation a stability which it would not otherwise have possessed, but has created a new standard of bus construction and new conditions of service. With operation in the hands of responsible corporations closely regulated by the State, the dilapidated vehicles of a few years ago are rapidly disappearing, and their place is being taken by modern buses, many of them of the gas-electric type. The haphazard and undependable transit facilities formerly offered are being supplanted by a unified service, operating in accordance with carefully prepared and supervised schedules.

That the adoption of the motor bus, as an auxiliary by street railway companies has permitted a great extension of transit facilities, is well demonstrated by the fact that Public Service Co-ordinated Transport, the largest of the State's operating companies, and which formerly supplied street car service to a maximum of 147 municipalities, now supplies transportation, by car or bus—in many cases both—to some 281 New Jersey communities. Supplementing the Public Service system, which operates more than 2500 miles of bus routes, other companies and individuals are providing such additional service that practically every section of the State has ample communication.

A feature of the New Jersey bus system that is constantly growing in popularity is the so-called "super" or "de-luxe" service. This provides at higher rates, a faster schedule and a more luxurious type of equipment, and thereby not only encourages the patronage of shoppers and theatre-goers, but at the same time lessens traffic congestion by inducing owners of private automobiles to use buses.

In addition to its system of intrastate bus and car service, New Jersey has a large and growing system of interstate buses, affording speedy transportation between its municipalities and New York and Philadelphia. The operation of lines of this character has been facilitated by the construction of the great Delaware River bridge between Camden and Philadelphia, and the Holland vehicular tunnel between Jersey City and New York. The completion of the great suspension bridge which is to span the Hudson River between Fort Lee and the upper

ELEVATED STRUCTURE OF PUBLIC SERVICE AT HOBOKEN

ATHENIA SUBSTATION—PUBLIC SERVICE ELECTRIC & GAS COMPANY

part of Manhattan will undoubtedly give additional impetus to this form of bus traffic.

These interstate lines not only provide what may be called commuter service in and out of New York and Philadelphia, but in addition carry large numbers between these metropolises and New Jersey's famous coast resorts. Still another type of bus transportation with which the State is amply provided is that afforded by the longer interstate lines, which not only connect New Jersey points with Pittsburgh, Cleveland and Chicago, but in some cases run as far west as California.

The flexibility of the motor bus, the rapid expansion of the State's system of hard-surface roads, and the success that has attended the adoption by New Jersey utilities of the bus as a transportation facility, assure to every New Jersey community ample transportation in the future.

ONE OF THE PENNSYLVANIA RAILROAD'S THROUGH SCHEDULED FREIGHT TRAINS

Photographed near Colonia, N. J., enroute from the west to tidewater at Jersey City. Practically all Pennsylvania Railroad through freight trains have now been placed on schedules almost as rigid as those of the passenger flyers. Sixty-one of them have been given names. The "Greyhound" carries livestock from St. Louis to the seaboard; the "Packer" perishable freight from Chicago to Jersey City, and the "Ironmaster" general merchandise from Pittsburgh to tidewater.

TOP—BROADWAY LIMITED OVER THE PENNSYLVANIA
Jersey City to Chicago in 20 hours—Photographed at Metuchen

MIDDLE—BOARDWALK FLYER OF THE READING
Camden to Atlantic City—55 miles in 60 minutes

LOWER—BLACK DIAMOND EXPRESS, LEHIGH RAILROAD
Entering Raritan Valley from West Portal

Chapter VII

Transportation and Commerce

RAILWAYS

It is the railroads of New Jersey that have put the State in the forefront among the great industrial centers of the United States. Much of her growth and progress is owing to her position in the heart of the manufacturing belt extending along the North Atlantic seaboard from Virginia to Massachusetts. Many of her industries were originally attracted by the water-power facilities of the State. Their later expansion has been owing to quick transportation connections with the markets of the two neighboring metropolitan communities representing the combined purchasing power of more than 10,000,000 people.

Rail connections over which there are, on the one hand, short hauls from all points within the State to the ports of Newark, Jersey City, Hoboken, Trenton and Camden, are, on the other hand, a means of easy access to the coal and iron mines of Pennsylvania.

The six trunk lines that cross the central and northern part of New Jersey carry a large share of the commerce of the nation to and from the eastern seaports. An idea of the importance of these rail connections to the State is gained from the fact that they handle 94 per cent of the exports of the port of New York. Their presence furnishes a network of arteries of trade that make it very easy to distribute the products of the State through both foreign and domestic commerce.

Few states have as extensive railroad facilities as New Jersey, and few places in the world have as many large railroad terminals as the west shore of the Hudson River in New Jersey from Weehawken to Bayonne.

A description of the main railroad routes of New Jersey might well begin with those centering around New York Harbor. The West Shore, driven back from the Hudson by the precipitous hills below Haverstraw, enters the State by way of the Hackensack Valley, tunnels the lower Palisades at Weehawken, and terminates at the river there.

The main line of the Erie departs from the Ramapo Valley as it enters the State at Mahway; thence it passes through Paterson and Passaic, crosses the Jersey meadows, and ends at Jersey City. The Lackawanna enters the State below the Delaware Water Gap, proceeds by alternative routes to the lower end of Lake Hopatcong, and again proceeds by two routes from Denville to tidewater. One of these passes through Paterson and Passaic and the other through Newark. They converge at Hoboken.

The Lehigh Valley Railroad emerges from the valley of that name at Easton, Pa., and crosses into New Jersey there; thence it runs eastwardly to Bound Brook and to South Plainfield, turning there for Elizabeth, Newark, and finally Jersey City. Between Lansdowne and Neshanic it clings closely to the south branch of the Raritan River.

The Central Railroad of New Jersey, like the Lehigh Valley, enters the State at Easton, proceeds by a somewhat similar course to Bound Brook, and thence by way of Plainfield, Elizabeth, a long bridge across Newark Bay, and the Bayonne peninsula, to Jersey City. The closely affiliated Philadelphia & Reading crosses the Delaware a few miles above Trenton. It takes advantage of the break created by the Raritan River between the Watchung Mountains and the high ground southwest of there. At Bound Brook it turns its freight trains to reach tidewater at Port Reading in the Arthur Kill while its passenger trains go on to Jersey City.

The Baltimore & Ohio, it should be noted, operates its passenger trains in the State over

the Reading to Bound Brook and thence over the Central Railroad of New Jersey to Jersey City. The Baltimore & Ohio, the Philadelphia & Reading, and the Central Railroad of New Jersey run into the same passenger terminal at Communipaw in Jersey City. The Pennsylvania closely parallels this joint route across the State, with a passenger and freight service serving Trenton, New Brunswick, Elizabeth, Newark, and Jersey City.

This is one of the most intensively utilized stretches of railroad in the world. Passenger service is available from Manhattan Transfer to New York City over another line through the Hudson River tunnel. The main tracks of the Pennsylvania, in turn, are paralleled by its Camden & Amboy line to the southeast. Another line of the Central Railroad of New Jersey runs from Bayside, at the head of Delaware Bay, lengthwise of the State to Perth Amboy, Elizabeth, and Newark. Finally the New York & Long Branch line of the Pennsylvania connects the oceanside with the metropolitan district, passing through South Amboy and joining the main line of the Pennsylvania near Rahway.

These are the main rail radii which center in the densely populated and highly industrialized area around Newark Bay. Almost every carrier has a number of shorter lines connecting suburban areas with the central territory. The lines of the Erie from Nyack, New City, and Haverstraw, N. Y., each connect a number of Jersey localities with Jersey City. So does the Greenwood Lake division, with its three branches. Another branch includes Newark within the service of the system. The New York, Susquehanna & Western winds its way through a different territory, and by another tunnel through the lower end of the Palisades gives the system an outlet to the Hudson at Edgewater. The Lackawanna has branches to Montclair, Gladstone, Chester, Hampton, Franklin, and Branchville. The Lehigh Valley has several branches within the industrial area.

In determining the course of transportation lines in New Jersey, as elsewhere, geographical conditions play a part. The northern third of the State is mountainous, corrugated by ranges of hills of a generally northeasterly to southwesterly trend. In this section the railroad. either follow the valleys between these hills or take a tortuous course from one valley to another, perhaps along some traversing streams

Thus in the extreme northwestern part of the State the Lehigh & New England operates in the valley of the Paulinskill parallel to the Kittatinny Ridge, which divides the waters of that stream from those of the Delaware.

In South Jersey the railroads for the most part run in long and straight lines across the coastal plain. The Atlantic City line of the Reading pursues an undeviating course for long distances between Camden and the seaside resort; and the same is true of the Pennsylvania east of Cape May Junction.

Among the branch lines not terminating in the metropolitan area are the Central of New Jersey's south branch from Somerville to Flemington. The Raritan River Railroad runs between New Brunswick and South Amboy. Besides its line to Atlantic City, the Pennsylvania has several lines across the State. It has one from Monmouth Junction to Sea Girt; another from Camden to Seaside Park; a supplementary electric line to Atlantic City from Camden by way of Newfield. It has a branch from that point to Cape May City. The line of the Reading to Atlantic City has branches to Ocean City, Wildwood, Cape May City and other points inland and along the coast. The Tuckerton railroad extends from Tuckerton to Barnegat, and thence inland to Whitings. Barnegat is connected with Toms River by a branch of the Central of New Jersey.

The long list of steam railroads serving this fortunate State takes in the West Shore Railroad; Delaware, Lackawanna & Western; Erie; New Jersey & New York; New York, Susquehanna & Western; Pennsylvania; Lehigh Valley; Central Railroad of New Jersey; Philadelphia & Reading; West Jersey & Seashore; Atlantic City Railroad; Lehigh & Hudson; Lehigh & New England; Wharton & Northern; Mount Hope Mineral; Morristown & Erie; Rahway Valley; Raritan River; Union Transportation Company operating the line between Pemberton and Hightstown; Tuckerton; Baltimore & Ohio; and the Wildwood & Delaware Bay Short Line Railroad.

GRAIN ELEVATORS, DOCKS AND TRANSFER YARD OF WEST SHORE RAILROAD AT WEEHAWKEN

MAIN FREIGHT YARD OF WEST SHORE RAILROAD AT WEEHAWKEN

The character of the service provided by a railroad may be judged by various indications. The attractiveness and convenience of its passenger stations are important. Freight depots and team tracks should be abundant, capacious, and accessible. The facilities should conduce to safe and rapid handling. Passenger trains should be comfortable and clean. Track should be well ballasted. Locomotives should be powerful and kept in good working condition. Schedules should be well maintained, both passenger and freight. And in all of these things the railroads that form a network in New Jersey are notable. No State moves daily such a proportion of its population back and forth in the commuting zone.

The New York Central has a line in New Jersey—the West Shore. The major portion of the main line consists of a four-track freight and passenger line extending north from Weehawken by tunnel through the Bergen Hills to the State line just north of West Norwood, a distance of about 19 miles. A secondary line, the New Jersey Junction Railroad, is a freight line which extends north from a connection with the main line of the Pennsylvania Railroad and the National Docks Railroad, in Jersey City, crosses the main line of the Delaware, Lackawanna & Western Railroad and the Erie Railroad in Jersey City, connects with the Hoboken Shore Railroad in the vicinity of Willow Avenue, Hoboken, and runs thence north along the waterfront of Weehawken. From Weehawken the line continues north along the waterfront to a connection with the Erie Terminals Railroad at the Hudson-Bergen Counties line.

The principal terminus at Weehawken has 16 station tracks and five ferry slips. The freight station has team tracks of about 100 cars capacity, the less-than-carload transfer station 200 cars capacity, and the milk station 100 cars capacity. The icing station can fill 22 cars at one time. The passenger service on the West Shore within the State is almost exclusively suburban commuter service, principally moving via Weehawken and ferry to West 42nd Street and Cortlandt Street, Manhattan. The average daily trains moving in and out of Weehawken are 24 through trains and 57 suburban trains.

On its several parts, the Erie maintains ample freight-handling facilities in New Jersey. On the New York division there are 24 team tracks and they will hold 328 cars; the Newark branch, 18 team tracks, and they will hold 193 cars; the Greenwood Lake division, 41 team tracks, and they will hold 312 cars; the Northern Railroad of New Jersey, 21 team tracks, and they will hold 179 cars; the New Jersey & New York division, 15 team tracks, and they will hold 132 cars; and on its New York, Susquehanna & Western there are 39 team tracks which will hold 300 cars.

The freight-handling facilities of the Lackawanna in New Jersey are complete. The regular receiving and delivery stations in New York Harbor, including rail termini, are between Hoboken and Jersey City, and include a general delivery and receiving station for all kinds of freight and facilities for unloading milk transported in tank cars.

In the years between 1909 and 1913, the Lackawanna expedited its service by a major piece of engineering. For geographic and population reasons the road, after entering the State through the Water Gap, descended to Washington, N. J., and then ascended another valley to Lake Hopatcong—a detour of 39½ miles along a route of many grades and curves. The management decided to construct a line over an entirely new route rather than to improve the old line piecemeal.

The construction necessitated a viaduct 1,450 feet long and 65 feet high over the Delaware, another 1,100 feet long and 115 feet high over the Paulinskill, a fill three miles long and 110 feet high across the Pequest valley, and numerous other works of engineering. The result was a reduction of 11 miles in the main-line distance and an improvement of grade and curvature. The maximum grade was reduced from 60.2 feet to 29.04 feet per mile, 237 miles of rise and fall were eliminated, and so were 8.1 miles of curvature.

The Reading handles a great variety of traffic. As an instance of its service facilities, both freight and passenger, a description of its Trenton station can be given. Its passenger station has three tracks accommodating 18 cars, with two car-storage tracks for 25 cars. At the

ERIE RAILROAD COAL LOADER AT EDGEWATER

main freight station at Ringgold and Reading Streets, a 150-foot covered platform receives outbound freight, with ample warehouse accommodations. At the East Trenton freight station, there is a 60-foot covered platform for outbound freight, with ample warehouse, and three public tracks holding 20 cars.

The New York branch is the route of the Reading's famous "Every Hour on the Hour" Philadelphia to New York express trains. Entering New Jersey above Trenton, it crosses the State through a rolling country of prosperous farms. The Atlantic City line extends from Camden to Atlantic City, a distance of 55.5 miles. It is built as the crow flies, through a sparsely populated section, with neither large towns nor industries along the right of way, making ideal operation of the highest type of passenger service.

There is one stretch of track 18 miles long that does not deviate from a straight line, and another similar stretch of seven miles, where the curvature does not exceed one degree. There are 130-pound rails, creosoted ties, rock ballast, and an automatic system of train control. Track-walkers cover the entire distance daily, keeping the roadbed in perfect condition. The "Boardwalk Flyer" is operated over this line.

The density of traffic and the industrial development along the Pennsylvania within the State are indicated by the miles of track. Of its 1152.77 miles of main track, the total of first track is 739.02 miles; of second track, 293.43; of third track, 64.68; and of fourth track, 55.64 miles. The yard tracks and sidings add 851.64 miles, making an actual total of 2004.41 miles of track.

One of the most important aspects of railroad service is, of course, the rapidity with which passengers are carried and goods are delivered to their destinations. Perhaps equally important, at least in the passenger service, is the frequency of service—the number of trains operated daily. Time is of great importance for goods which are perishable or of such high value that the interest charges during transit are heavy; also for goods being sent to fill a rush order.

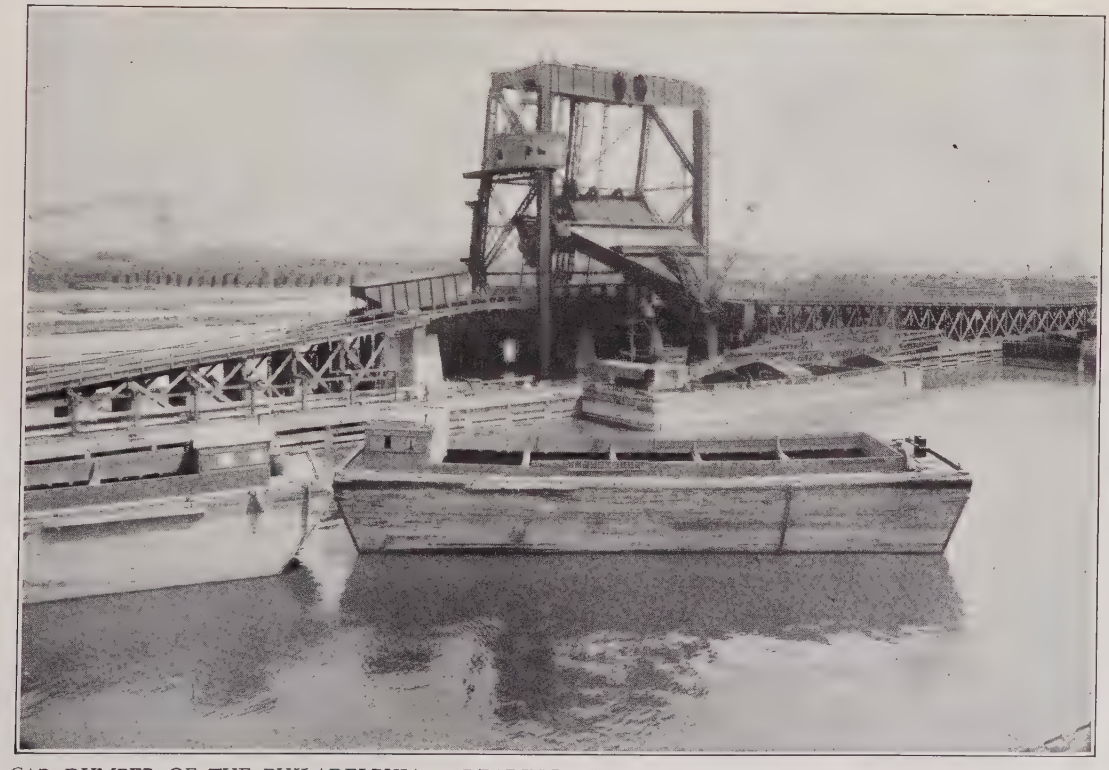
The Pennsylvania maintains a series of trains which it calls the "Limiteds of the Freight Service." Goods offered to the railroad at Jersey City are scheduled for delivery at Baltimore by the next noon. Perishables received at Baltimore will be forwarded to Jersey City by the next morning and non-perishables by the next noon. Freight for Chicago will be carried on "The Ace" and the "Star Union Line," arriving on the fourth morning. Starting in the same train and finishing in "The Valet," freight would be in Louisville by the fourth noon after the Pennsylvania received it. If sent to Rochester it would arrive on the third morning. Supplies could be obtained from the latter city on the third morning after they were sent.

Goods entrusted to the railroad at Newark for delivery in Cincinnati would arrive on the third afternoon, or at East St. Louis on the fourth morning, or at Norfolk, Va., on the second morning. From Indianapolis livestock shipped on "The Thoroughbred" will arrive in Newark by the fourth morning, and shippers of perishables have equally speedy delivery with "The Bullet." From Camden to Buffalo perishables arrive by the second morning on "The Bison" and non-perishables the morning after. Perishables consigned to Camden from Fort Wayne by "The Packer" arrive on the third morning.

For the shipper who does not have a carload of goods to send, the Pennsylvania provides daily through package-car service from Jersey City to Baltimore, Camden, Chicago, Columbus, Lancaster, Philadelphia (three stations), Pittsburgh, Trenton, Washington, Wilmington, and York. From Newark and Harrison daily cars are available to Baltimore, Camden, Chicago, Columbus, Fort Wayne, Indianapolis, Philadelphia, Pittsburgh, Trenton, Washington, and York. From Trenton there are daily cars to Allentown, Pa., Asbury Park, Long Island City, New Brunswick, Scranton, Toledo, and many other towns, as well as to 11 transfer points.

The Lackawanna, also, operates a through merchandise service from its transfer stations, New York Transfer and Scranton Transfer. Goods from points in northern New Jersey are scheduled for delivery by way of New York Transfer on the third day at Cleveland, De-

LEHIGH VALLEY RAILROAD DOCKS AND CAR FLOATS, AT JERSEY CITY



CAR DUMPER OF THE PHILADELPHIA & READING RAILROAD AT PORT READING, NEAR CARTARET

troit, Pittsburgh, Toronto; the fourth day at Chicago, Grand Rapids, Louisville, Toledo; and the fourteenth day at Los Angeles and San Francisco.

Similar service is available by way of Scranton Transfer from the Reading and Central Railroad of New Jersey stations at Jersey City, Newark, Elizabeth, Camden, Trenton, and elsewhere, if Lackawanna routing is used. Every freight or passenger station is, in a sense, a terminal facility, but the term is commonly used to describe those forms of transportation plants that grow up where a large amount of traffic reaches the end of its destination, or where an important break in the form of transportation occurs. The existence of such facilities is an outstanding characteristic of transportation in New Jersey.

In northeastern New Jersey is to be found one of the greatest concentrations of terminal facilities in the world. They fall into two great groups. One series lies along the Hudson, at the foot of the lower Palisades, on the low rocky ridge which forms a continuation of those cliffs. The other series of terminals lies in the "Jersey meadows" behind the Palisades ridge. Here there is flat ground almost ideal for the laying out of large freight yards, although calling for some filling. This series of terminals continues along the west shore of Newark Bay and the Arthur Kill behind Staten Island.

These terminal facilities are of various kinds. Some are employed to transfer freight from railroad cars to vessels; others are equipped to shift the freight from railroad cars to motor trucks, or from one car to another. In still other instances the terminals are used for inspecting and auctioning produce freight; for collecting freight to be turned over to the main railroads; and for making and breaking up trains. This last type of terminal is what is called a classification yard.

The terminal properties of the West Shore include three piers on the North River and the Manhattan Produce Yard in Kearny, N. J. The capacity of this produce yard is 550 cars for team-track delivery, 450 cars for receiving and display purposes, and a receiving and classification yard holding 1,256 cars, or a total of approximately 2,156 cars.

The Erie has important special facilities. Fruit is handled in large tonnage eastbound into the New York metropolitan area from Pacific Coast territory and many intermediate localities. To take care of this a separate yard at Croxton, N. J., has nine tracks. Icing facilities for 400 cars at one setting and a platform 1120 feet long are provided. Fruit and vegetables requiring New York City delivery are moved from Croxton to Jersey City floatbridge. New bridges constructed in 1927 are in service north of the Jersey City passenger station. Fruit and vegetables not moved to New York City are handled at Monmouth Street team tracks in Jersey City. The yard has 10 tracks, holding 191 cars. The daily turnover is 80 to 90 cars.

At Jersey City a large team track and platform track capacity is used by the fruit and vegetable trade in the busy season; 11 tracks with capacity for 125 cars can be used. Icing facilities are available at Jersey City. Fruit for export is lightered at Jersey City and Weehawken piers as convenient.

The Erie rails reach the Jersey City Stock Yard Company at Jersey City, where 16 cars can be unloaded at one time. Seven cattle-boats make New York Harbor deliveries. A grain elevator of 1,500,000 bushels capacity is located on an Erie pier at Jersey City. At Weehawken the Erie Railroad operates a large terminal of 1420 cars' capacity. Live poultry is handled at a special facility of 50-car capacity. Delivery is made at the poultry yard from cars to the trade. At Undercliff is a large terminal operated by the Erie. This is in connection with a yard at Undercliff Junction with 1535-car capacity. The river at Undercliff is reached by a double-track tunnel. The waterfront yard has 1248 cars' capacity.

In the Erie service in and out of Jersey City about 500 cars and 100 engines are used, and 50,000 passengers arrive and leave Jersey City station daily, commuting to and from New Jersey and points north of the State line. A standard morning train in and an evening train out handle 12 steel coaches. Such service operates within 30 miles of Jersey City. A

MORSE'S FIRST EXPERIMENTS WITH TELEGRAPHY HERE, MORRISTOWN

LOADING CRANE, READING RAILROAD AT TRENTON

LEHIGH RAILROAD ROAD BED

LACKAWANNA ROAD BED AT TOWACO

large milk tonnage arrives at Jersey City during the night and is handled at platform team tracks before daylight, empty cans being loaded in cars for return movement.

The terminal equipment of the Lackawanna railroad is capacious. The Hoboken terminal accommodates 150,000 travelers daily and is one of the most convenient railroad terminals in the world, comprising a great ferry and railroad structure, with six slips to accommodate the ferries to and from New York City. The train-shed covers 17 tracks and is 607 feet in length. Adjoining the Hoboken terminal are the piers of the United States Lines, the North German Lloyd, Holland-America, Lamport & Holt, and Scandinavian-American Lines.

The handling of milk is one of the most important classes of traffic. Through milk trains are operated into Hoboken daily on fast schedules from points in New York, Pennsylvania and northern New Jersey, the average number of milk refrigerator cars arriving in Hoboken each day being 62, the equivalent of 13,000 40-quart cans. The health of New York and its environs depends largely on the Lackawanna milk-train service. In addition, modern facilities have been installed at Hoboken and Newark for unloading milk transported in tank cars.

The Lackawanna is one of the largest anthracite coal carriers in the country, normally handling 12,000,000 tons annually, of which about 2,500,000 tons go through its Hoboken tidewater terminal.

Grain in bulk for domestic consumption and trans-shipment to foreign countries is handled direct from cars to grain barges. As many as 260 carloads have been unloaded in one day, or in excess of half a million bushels. A goodly proportion of grain for export moves to foreign destination in cargo lots, and the Lackawanna's facilities permit of loading six steamers at once, floating elevators transferring the grain from barge to steamer, as many as three operating simultaneously in loading. As each floating elevator has a capacity for handling 20,000 bushels an hour, it is possible to load a large steamer within a single day. At this terminal there are warehouses of modern construction equipped not only to take care of perishable merchandise requiring refrigeration, but to service goods requiring only ordinary dry storage.

The Manhattan produce yard, on the New Jersey side of the Hudson River, constitutes an auxiliary to the Pennsylvania Railroad produce terminal. It has been greatly extended and is the largest capacity yard in the world devoted to perishable freight. There are seven modern float-bridges used for placing the loaded cars on the car-floats and receiving the empty cars from the floats for the return movement. To the west of the supporting yards is the largest receiving and break-up yard on the Atlantic coast devoted to perishable freight service. It has a capacity of 1100 cars and is utilized exclusively for produce traffic. Cars received at this point are passed over a gravity hump to their proper classification tracks, where they are segregated as to consignees and commodities, in order to facilitate unloading upon arrival at the terminal.

A plant for icing cars is regularly operated at Jersey City, and cold storage also is available. The independent facilities of the yard include four display tracks, adjacent to covered platforms. On these tracks refrigerator cars may be placed, their doors opened and samples of their contents removed to the covered platforms for display to buyers.

The display tracks at Manhattan produce yard are used principally for handling watermelons and juice grapes. In the season of 1927 over 3,500 carloads of watermelons were sold at the yard, the juice-grape receipts for the season approximating 10,000 cars. An average of two cars of grapes per minute are sold at the auctions throughout the period of the crop movement. The Pennsylvania Railroad has provided a new pier for the apple-export trade. In one season the railroad handled 12,000 carloads of export apples through New York Harbor.

The principal terminal facilities of the Lehigh Valley Railroad are in the tidewater basin opposite the lower tip of Manhattan; in the great piers of the Claremont terminal farther down New York Bay; in a large yard

REFRIGERATOR CARS ON DISPLAY TRACKS
Manhattan Produce Yard, Pennsylvania Railroad—largest in the world—capacity 2,200 cars

ERIE RAILROAD FRUIT YARD, MONMOUTH STREET, JERSEY CITY

across Newark Bay from Claremont; and in "Fitzpatrick farm." The new project at the tidewater basin has a track capacity of 26 cars and a traveling crane with a capacity of 20 tons. Along the length of the bulkhead an area is reserved for storage and unloading purposes. This will accommodate over 500 crated automobiles or about 100 carloads.

The Lehigh Valley also has a tract of 535 acres at Claremont terminal, in the Greenville section of Jersey City. The site is advantageous because the berthing space for ships is on a direct line from the Narrows, which connects the upper and lower portions of New York Bay, and makes possible docking without the aid of tugs. The first unit of the terminal which has been constructed and is now in operation is two-thirds of a mile in length with a water-draft of 35 feet at mean low tide, affording easy berthing for the largest steamers afloat. A dock for the handling of iron ore and similar bulk freight, equipped with two unloaders of 15-tons and 5-tons capacity, is able to load 400 cars from boats every 24 hours.

Fitzpatrick farm at Hillside, adjacent to Newark and Elizabeth, is a new industrial site, offering advantages for the manufacturer seeking a location for his factory or a site for an additional plant. It is only 13 miles from New York City and on the borders of Newark and Elizabeth, in the heart of a thriving and rapidly developing territory. It is served directly by the Lehigh Valley Railroad, with numerous well-paved thoroughfares.

The principal freight terminus of the Reading is on the Jersey mainland across from Staten Island. The freight station has delivery tracks accommodating 20 cars. In addition there are coal- and coke-dumping facilities at Port Reading. The main yard has a storage capacity for 2800 cars. Port Reading terminal is on the Arthur Kill, about 17 miles from New York City, and four tugs are kept in operation 24 hours daily.

GREAT BRIDGES AND TUNNELS

Unusual and unprecedented means of transportation such as bridges and tunnels are required to take care of the great increase of urban population which must be absorbed by New Jersey. Nowhere else in the world has there been so much construction of great tunnels and bridges as that which has been completed recently in the vicinity of New York and Philadelphia.

New Jersey, as an equal partner with New York, has been engaged in the most extensive and difficult program of bridge and tunnel construction that has ever been undertaken. The Holland Tunnel was built jointly by the New York State Bridge and Tunnel Commission and the New Jersey Interstate Bridge and Tunnel Commission. The Delaware River Suspension Bridge, connecting Philadelphia and Camden, was built by the Delaware River Bridge Joint Commission of the States of Pennsylvania and New Jersey. The same men represent New Jersey on each of these bi-state commissions.

The Outerbridge Crossing, between Perth Amboy, N. J., and Tottenville, Staten Island, and the Goethals Bridge between Elizabeth, N. J., and Howland Hook, Staten Island, are noteworthy cantilever bridges. They were built by the Port of New York Authority, which is now constructing the new Hudson River Bridge and the bridge between Bayonne and Staten Island over the Kill van Kull.

The Holland Tunnel

The Holland Tunnel was constructed by the bi-state commission that also built the suspension bridge at Camden. The first idea of building a bridge between New York and New Jersey was superseded by the tunnel project in 1913. This great vehicular tube has a larger cross-section and is longer than any other, but its fame as the greatest of all tunnels is based on the fact that it has been constructed for the traffic of thousands of motor cars which throw off large quantities of deadly gases. To accomplish the intended purpose, it was necessary to provide an infallible system of ventilation, illumination that must never fail, fire-fighting apparatus designed for tunnel service, and

GOETHALS BRIDGE AT ELIZABETH

OUTERBRIDGE CROSSING AT PERTH AMBOY

dozens of safety devices to meet every possible emergency. Energy for this equipment is supplied by four power houses having a total capacity of 6000 horsepower.

The Holland Tunnel has been planned with such care that it is safer than most city streets. On the opening day, November 13, 1927, there were 51,000 cars rapidly transported through it without a single accident. The continued maintenance of this high efficiency is a tribute to the wisdom of the builders.

The tunnel consists of twin tubes, one for traffic in each direction. The tube itself is made of a cast-iron lining covered with concrete. The lining is circular in shape, 29 feet 6 inches in diameter, and is made in segments which were placed in position one at a time, bolted to the preceding section and calked to prevent water leaking into the interior. Finally the iron lining was covered with concrete.

Each tube is 9,250 feet long, of which length 5,480 feet is directly beneath the Hudson River. The entrances and exits in lower New York and in Jersey City are separated so as to prevent congestion at the terminals. The maximum depth of the roadway below mean high water is 93 feet, with a minimum depth of the soil between the bed of the river and the top of the tunnel lining of 16 feet. The roadway in each tube is 20 feet wide with a clear headroom of 13½ feet.

Forty-two large fans are used to propel air into the tunnel, through a space underneath the roadway. It is brought into the tunnel at frequent intervals through the sides, so that there is no longitudinal air movement. Forty-two other large fans exhaust the vitiated air through openings in the roof near the point of entrance. The system provides for changing the air 42 times per hour. It requires a supply of air per minute of 3,761,000 cubic feet.

Two hundred and ten specially trained policemen are required to direct traffic. There must be absolute continuity of lighting, so to secure this end, every second lamp receives its electricity from New Jersey and the alternate ones get their current from New York. Furthermore, the power from each of these States is supplied by three separate cables and originates at two independent sources. The tunnel cost $48,400,000. For the first full year of operation —November 13, 1927, to November 12, 1928— 8,517,689 vehicles passed through the tunnel and the income from tolls was $4,700,201. The maintenance cost was $3,664,591.

Hudson River Railroad Tunnels

A vast improvement in transit facilities between New Jersey and New York City was effected with the opening of the railroad tunnels under the Hudson. These are for electrically equipped trains only.

The Pennsylvania Railroad Passenger Tunnel to the terminal at 33rd Street, New York, and from thence under the East River to Long Island, affording through train service to New England, was opened November 27, 1910. From its New Jersey entrance to the Pennsylvania Station in New York it is 13,380 feet. Including the Long Island extension the length is 26,930 feet.

The Hudson & Manhattan Railroad Tunnels were opened by units—the first February 26, 1908 and the last, October, 1911. There are two tubes extending to Down Town New York and another pair to 33rd Street at Broadway. In New Jersey these divide, affording direct lines to Hoboken and to Newark via Jersey City. From Hoboken to the uptown terminal the tunnel is 3.5 miles long and to the Hudson Terminal (downtown) it is 3.0 miles. From the Jersey City entrance to 33rd Street is 5.0 miles and to the Hudson Terminal, 2.6 miles.

The Hudson River Bridge

Along about 1810 Thomas Pope published a treatise on bridge architecture which, while it reveals an utter lack of knowledge of engineering design and construction existing at the beginning of the Nineteenth Century, is still the first known proposal for a bridge across the Hudson between New York and New Jersey. It was to have been constructed of timber, fastened with iron bolts, erected as a cantilever from each end, and after joining at the center made to appear as a very flat arch. Modern analysis shows it could not have carried more than a tenth of its own dead weight.

The Hudson River Bridge now being built from the Fort Lee Palisades in New Jersey to

VICTORY BRIDGE, LOOKING TOWARD PERTH AMBOY

HOLLAND TUNNEL

The New Jersey-New York line is under the middle of the river

the high ground in New York City at Washington Park, is designed for the unprecedented span of 3500 feet—twice the length of anything yet built. A bridge double the span of the Delaware River Bridge and carrying a dead weight in the suspended span of 90,000 tons is a leap into the realms of new engineering wonders. Traffic studies indicate a volume of over 8,000,000 vehicles for this bridge the year following its opening in 1932, and a steady increase up to 16,000,000 in 1960.

The Hudson River Bridge will be a suspension bridge 205 feet above the river, with towers 635 feet high and four steel wire cables each 36 inches in diameter. The site chosen is advantageous and economical because the high land on both sides of the river permits the use of comparatively short approach spans. The New Jersey anchorage can be built directly into the solid rock. The towers will be of silicon steel skeletons, covered with concrete and faced with granite. The total length of the structure, with approaches, will be 8080 feet.

The bridge is designed for an average dead load per linear foot of about 40,000 pounds. There will be four 36-inch wire cables placed in pairs. Each cable will have 61 parallel strands of 434 galvanized steel wires of 0.196 inches diameter, making 26,474 wires in each cable and providing an ultimate strength of 180,000,000 pounds. The total capacity of the cables will be about 2.8 times as great as the actual maximum pull from all the suspended loads and wind. Their strength is almost exactly three times the strength of the cables in the Delaware River Bridge and three times the strength of those in the Manhattan Bridge from New York City to Brooklyn—now the two suspension bridges with the strongest cables.

The trusses will support two sets of floor beams and stringers. The upper floor system will carry eight lanes of vehicular traffic. The lower roadway will be completed when the necessity for rapid transit electric trains arises. This arrangement leaves an almost unobstructed view from the upper deck of a remarkable scenic panorama of the Palisades, river, and New York sky line.

It is planned to open the center four-lane roadway and footwalks for traffic some time during 1932. Up to this state of completion the bridge will have cost around $60,000,000. The other roadways, the rapid transit tracks and the masonry towers will be finished at a later date at an additional cost of $15,000,000, making the total expenditure $75,000,000. The New Jersey tower foundation and the New York anchorage were started in the spring of 1927.

Other Bridges

The project of connecting Philadelphia and Camden by the erection of a bridge was under discussion for a century. The dream was finally consummated and the bridge opened for vehicles at midnight July 1, 1926, a few days ahead of schedule. For the first 30 months of operation ending October 30, 1928,—20,886,376 vehicles, a daily average of 24,486, passed over the bridge. It is the largest structure of its kind in the world today. It has a span of 1750 feet between the main piers, and its 30-inch diameter wire cables are also the largest yet constructed. It has a height of 135 feet over the middle of the river. The main deck provides for six lines of automobiles and two of electric cars inside of the main trusses and two additional lines of electric cars carried on brackets outside the trusses.

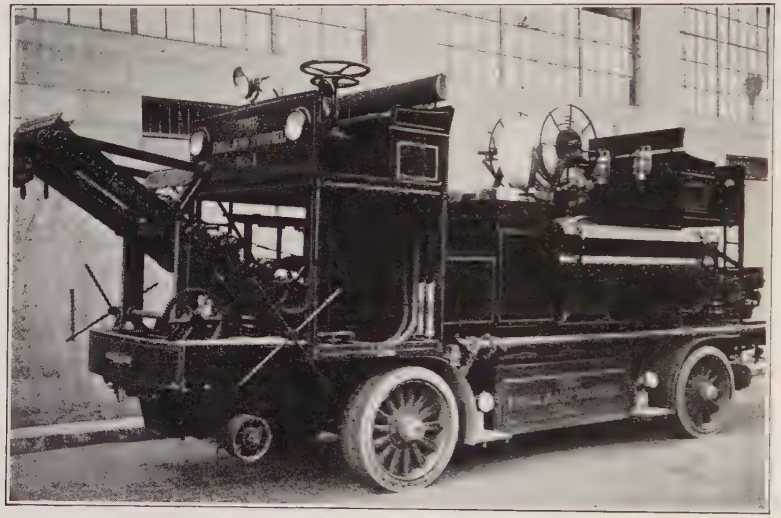
The general details and dimensions of the bridge are: Length of clear span, 1750 feet; length with approaches, 9510 feet; width of bridge, 128 feet; each of eight towers above water, 380 feet; clearance above mean high water, 135 feet; weight of main span per linear foot 26,000 pounds; live-load capacity per linear foot, 12,000 pounds; and total weight of suspended structure, 40,000 tons. As for materials, the masonry totaled 315,000 cubic yards; paving, 70,000 square yards; steel for the main structure, 35,900 tons; and steel for the approaches, 25,800 tons. The cost was $36,023,373.

The twin bridges known as the Outerbridge Crossing between Perth Amboy, N. J., and Tottenville, Staten Island, and the Goethals Bridge between Elizabeth, N. J., and Howland Hook, Staten Island, are very similar in design and construction. They were both authorized

HOLLAND TUNNEL—VENTILATOR AT JERSEY CITY

HOLLAND TUNNEL—VIADUCT TO JERSEY CITY ENTRANCE

HOLLAND TUNNEL—ENTRANCE AT NEW JERSEY



HOLLAND TUNNEL—EMERGENCY TRUCK

at the same time and in similar acts of the two State legislatures. They were completed and dedicated on the same date, June 20, 1928, and were opened to traffic on June 29, 1928. The two structures are identical in the essential matters of conception, design, construction and date of completion, and as in the case of the other bridges, they are the result of constantly growing needs for increased transportation facilities. They were completed ahead of schedule and at less than the estimated cost of $18,000,000.

Both of these Arthur Kill bridges are mainly for highway traffic and are designed to carry 20-ton trucks. In addition to the 42-foot roadway for highway traffic (four lanes) the bridge at Perth Amboy will carry two lines of rapid transit cars when needed, placed on the outside of the trusses on brackets. The structures are both of the cantilever type, and each has a clearance above the water of 135 feet.

The Outerbridge Crossing is 10,200 feet long and has a 750-foot cantilever span with a 375-foot anchor arm, a 300-foot simple span and a plate girder approach, all being supported on concrete towers of appropriate design.

The Goethals Bridge has a length with approaches of 8,500 feet and consists of a 672-foot cantilever span. It has a 240-foot anchor arm and plate girder approaches on each side, all of which are carried on concrete towers or piers.

In March, 1925, the legislature of New Jersey passed an act authorizing the Port of New York Authority to construct a bridge across the Kill van Kull from Bayonne, N. J., to Port Richmond, Staten Island, and in 1926 New York enacted similar legislation. The estimated cost of the bridge is $16,000,000, including the property required for approaches and plazas. The first contract was awarded July 5, 1928. This bridge is a necessary connecting link with the Outerbridge Crossing and the Goethals Bridge. The shortest and most direct line from New York via the Holland Tunnel or the Hudson Bridge to the New Jersey shore resorts and to Philadelphia and the West will be by way of the Hudson Boulevard, the Bayonne Bridge, and then across Staten Island and over Outerbridge Crossing into Perth Amboy. South and West traffic out of Perth Amboy will be largely over the recently completed Victory Bridge, which is a fine example of a low-level bridge with consideration for a suitable artistic treatment.

The Kill van Kull Bridge will have a span of 1700 feet, or practically the same span as the Delaware River Bridge. It is proposed to construct a roadway for six lanes of traffic, the same as at Camden. The clear height between the river and the bridge is planned to be 150 feet, or somewhat more than for the Arthur Kill bridges, which have 135 feet clearance, the same as the East River bridges in New York.

In addition to the bridges already mentioned there are a great many railroad and highway structures in New Jersey, including very early ones with an interesting history of long service. The State Highway Commission is studying the problem of transportation and has a comprehensive plan of state highways that recognizes the new conditions rapidly arising. This plan includes many new bridges. An outstanding example of the new type of bridge engineering now being favored because of its artistic architectural features is the new highway bridge over the Raritan River at New Brunswick.

SUSPENSION BRIDGE FROM ROOF OF VICTOR TALKING MACHINE COMPANY OFFICE BUILDING

OCEAN-GOING FREIGHTERS LOADING AT WEST SHORE RAILROAD PIERS, WEEHAWKEN

PORTS AND TERMINALS

With competition among the cities on the Eastern seaboard and their campaigning for better water and port facilities, came the demand for some organization that could more adequately cope with the many problems. This need was met by the establishment of port commissions. The first in New Jersey was that of the Port of New York Authority, followed recently by movements in other parts of the State creating additional port commissions.

The Port of New York, through which half the foreign commerce of the United States flows, is undertaking by novel machinery to overcome political, physical, and economic handicaps, to achieve commercial and transportation coherence, and to provide for future development. Lying partly in the State of New Jersey and partly in the State of New York, divided by wide and deep waterways difficult to tunnel or bridge, thus causing railroad carriers to mass largely on one side and deliver and assemble much of their freight on the other side by expensive and complicated means, its problems are many and most complex.

To the Port of New York Authority, created in 1921 by a compact between New Jersey and New York, assented to by the Federal Congress, has been entrusted the task of unifying the port and modernizing its facilities. At the same time it fills the rôle of port defender against the ambitions of those who would divert commerce to other and less favorably located harbors.

The comprehensive plan of the Port Authority provides that all parts of the port shall be brought together by a series of rail belt lines so that freight may be transported to and from any section without the delay and expense of the present car-float and lighterage operations. Thus the great trunk lines that terminate on the New Jersey side of the Hudson will have direct access to Manhattan, Brooklyn and Queens, while the New England carriers will be able to offer service to the manufacturing interests of New Jersey. The principles of the comprehensive plan as formally set forth in the law are as follows:

That terminal operations within the port district, so far as economically practicable, should be unified.

That there should be consolidation of shipments at proper classification points so as to eliminate duplication of effort, inefficient loading of equipment, and thus realize reduction of expenses.

That there should be the most direct routing of all commodities so as to avoid centers of congestion, conflicting currents, and long truck-hauls.

That terminal stations established under the comprehensive plan should be union stations, so far as practicable.

That the process of coordinating facilities should so far as practicable adapt existing facilities as integral parts of the new system, so as to avoid needless destruction of existing capital investment and reduce so far as may be possible the requirements of new capital; and endeavor should be made to obtain the consent of local municipalities within the port district for the coordination of their present and contemplated port and terminal facilities with the whole plan.

That freight from all railroads must be brought to all parts of the port wherever practicable without cars breaking bulk, and this necessitates tunnel connection between New Jersey and Long Island, and tunnel or bridge connections between other parts of the port.

That there should be urged upon the Federal authorities improvement of channels so as to give access for that type of water-borne commerce adapted to the various forms of development to which the respective shore fronts and adjacent lands of the port would best lend themselves.

That highways for motor-truck traffic should be laid out so as to permit the most efficient inter-relation between terminals, piers and industrial establishments not equipped with railroad sidings and for the distribution of building materials and many other commodities which must be handled by trucks; these highways to connect with existing or projected bridges, tunnels and ferries.

That definite methods for prompt relief should be devised which can be applied for the better coordination and operation of existing facilities while larger and more comprehensive plans for future development are being carried out.

The Port District comprises about 1,500 square miles of territory, including the whole of Greater New York City and much of Westchester County; and in New Jersey the whole or the greater part of the counties of Bergen, Hudson, Passaic, Essex, Union and Middlesex. It extends approximately 25 miles in any direction from the Statue of Liberty. Its population of 9,000,000 is constantly increasing, and it is

UNITED STATES LINE PIERS AT HOBOKEN
The "America" is the trans-Atlantic liner docked at the left of the piers

ONE OF THE BIG PRIVATE PIERS ON THE WATER FRONT

of 9,000,000 is constantly increasing, and it is at once the greatest market place and the greatest manufacturing district of equivalent area in the world.

One of the first achievements of the Port of New York Authority was to secure the creation of what is known as Belt Line No. 13. This facility, running for 17 miles along or parallel to the Hudson River from Fort Lee to Bayonne, is now operating as an entity, tying together the freight terminals of all the New Jersey railroads and giving a speedy and economical interchange to those carriers. The industries in the territory contiguous thereto have gained great advantages not only in time and better service but in the saving of freight charges.

Studies have been in progress for some time on the proposed Belt Line No. 1, connecting New Jersey with Long Island by means of a tunnel under New York Bay and, proceeding over the Hell Gate Bridge, terminating at Spuyten Duyvil on the Hudson River. This belt line would almost encircle the central part of the port. Much of the new construction would be in New Jersey where new territory would be opened for development.

Four interstate bridges have been fathered by the Port Authority—the Hudson River Bridge between Fort Lee, New Jersey, and Washington Park, Manhattan; a great arch bridge from Bayonne, New Jersey, to Port Richmond, Staten Island; the Goethals Bridge, connecting Elizabeth, New Jersey, and Howland Hook, Staten Island; and the Outerbridge Crossing, from Perth Amboy, New Jersey, to Tottenville, Staten Island. The Port Authority believes that its plans will bring about a more equitable distribution of population in the New York-New Jersey region. Among its other activities the Port Authority is co-operating with the North Jersey Rapid Transit Commission in studying plans to relieve congestion in the entire district.

Plans for the first inland freight station have reached the point where prospective operators have been invited to submit proposals. Waterfront property in both New York and New Jersey would be released for its proper purpose, that of shipping, under the inland station system, it is claimed. The Railroad Presidents' Conference has named a contact committee to study this subject with the Port Authority.

A survey discussing airports for the port district was made public largely for provocative purposes and preceded the appointment of a general fact-finding committee under Federal auspices. Investigation of this question has continued in co-operation with Federal, State and municipal authorities. Another survey which was made at the request of the poultry trade of the metropolitan district advised establishment of a union live poultry terminal for New York and New Jersey at Weehawken.

The Port Authority has aided a number of municipalities in their investigation of the possibilities of marine terminals and it has given similar aid to the improvement of channels and waterways.

The commissioners take an impersonal pride in the financial chapter of the Port Authority history. To have attained a recognized investment standing in financial circles is a notable achievement in itself, after the comparatively brief existence of this organization. Financial standing is essential to success, since under the law the Port Authority cannot attempt anything not economically practicable. Only a portion of the funds necessary for its construction program has been derived from bond issues of the two States. The rest has been secured on the credit of the Port Authority.

The city of Newark is situated on Newark Bay and has 10.5 miles of waterfront. Port Newark, a municipal development, is constantly growing more prominent among Atlantic ports. During the last decade the city has invested over $10,000,000 in the development of its waterfront. Fully 1,100 acres of meadow land have been reclaimed and subdivided into industrial sites. The channel has been deepened to 31 feet and widened. Freight cars are brought here to the terminal docks and their cargoes deposited directly into the vessel's hold. Overhead cranes and other equipment for loading and unloading, together with extensive warehouses of modern type, provide all the facilities essential to a great port.

The South Jersey District comprises the territory bordering on Delaware River and Bay and the Atlantic Ocean from the head of tide-

PORT NEWARK

The City of Newark has expended $10,000,000 in its development. Covers 1,100 acres, has a 31-foot channel, and extraordinary warehouse and docking facilities. Newark Airport, also Municipally owned, is seen in the background

water at Trenton to Great Egg Harbor Inlet, embracing the seven counties of Mercer, Burlington, Camden, Gloucester, Salem, Cumberland and Cape May. The district was created as a State agency, and the South Jersey Port Commission was established with power "over the survey, development, control and operation of port facilities in such port district."

The commission will develop a comprehensive plan for South Jersey's water, rail and other transportation facilities to meet the rapid industrial growth and increase in population in this section of the State and to protect the interests of its manufacturers and shippers.

As its first achievement it plans a large marine terminal at Camden. The site covers 53 acres of river-front property with belt-line service by the Pennsylvania and Reading Railroads. It is in the center of the Camden waterfront, between the Pennsylvania Railroad terminus and the Municipal pier. The commission operates the Municipal pier and, with the new terminal, it will have supervision of a water frontage of 2,370 feet. At the former, eight South American and Pacific Coast steamship lines now make regular calls.

In connection with the construction of the Camden Marine Terminal it is planned to dredge and maintain a channel of 30 feet at mean low water between the new terminal frontage and the main ship channel, which is of 35 feet depth to the sea.

The commission has been active in promoting a 20-foot channel from Camden to Trenton. It has co-operated with Salem in the straightening of Salem River, which work was recently completed under the direction of Government engineers. The cut-off shortens the distance from Salem to the Delaware Bay about three miles. The mouth of the river is opposite the northernmost entrance of the new Chesapeake and Delaware Canal, which has been deepened to a 12-foot channel, affording a more direct water route for small steamships plying between Delaware River ports and Baltimore and providing an ideal inland waterway as far south as Norfolk.

The first railroad built in the State of New Jersey had South Amboy as its eastern terminus for the reason that South Amboy was located on Raritan Bay, and there was thus provided cheap water transportation to New York. An effort is being made to have the Amboys resume their importance in marine trade.

For some years there had been men and civic organizations in New Brunswick, Perth Amboy, South Amboy, Sayreville, South River and the surrounding territory, actively attempting to improve the water transportation facilities in their vicinity. Finally in 1920 there was formed the Raritan Terminal and Waterways Association, and because of this in 1924 there was created out of it the Port Raritan Survey Commission, with representatives from the Board of Freeholders of Middlesex County and from the municipalities of Perth Amboy, New Brunswick, South Amboy, South River, Woodbridge, Sayreville, and Raritan.

Among the projects in which the commission has interested itself are,—the reclamation of areas of the lowlands at Perth Amboy and at South Amboy; development of adequate terminal and warehouse facilities at Perth Amboy; removal of explosives from Raritan Arsenal; deepening and straightening South River to aid the commerce now using it and as a connection to the proposed New Jersey Ship Canal; deepening of the Raritan River from Washington Canal near the mouth of South River to New Brunswick, and from the main division channel in Raritan Bay to the deep pool above the New York & Long Branch Railroad bridge at Perth Amboy; and the deepening of Woodbridge River.

It is again becoming a familiar sight to see in the port of Perth Amboy the flags of foreign nations, and with the constantly increasing congestion of New York Harbor it is expected that more transportation lines and industries will seek locations in the area favored by the Port Raritan commission.

The city of New Brunswick is constructing a dock at the head of navigation of the Raritan River and is so building it that advantage can be taken of an increased depth of channel.

More and more the strategic positions of the New Jersey shore and river borders are receiving recognition from the captains of industry and commerce.

CAMDEN MUNICIPAL PIER
First unit of the projected water-front development

The New Jersey side of the deep and navigable waterway of the Hudson and New York Bay from Edgewater to the "tip-of-the-boot" at Bayonne; the water frontage around into the broad expanse of Newark Bay, where the affluences of the Hackensack and Passaic Rivers afford still many an available tide-water industrial site; the shores of the Arthur Kill at Elizabeth, Carteret and Perth Amboy; and the Raritan Bay district; constitute a seaboard area exceeding 100 miles of ports and terminals and skirting a hive of industry.

Down the long ocean front from Atlantic Highlands to Cape May and up the lower Delaware Bay there is little industry except fishing. At Paulsboro, however, the commercial aspect of things comes again into view. From here to Trenton the cities and towns along the Delaware River are encouraging industries to occupy the sites that are yet available, and this important artery of commerce is rapidly assuming its proper place in the development of the State.

The advantages that accrue to industry from the direct receipt of raw materials by water and the opportunities for coast-wise and trans-oceanic shipments without a long overland haul, assure the State stability and permanence of business.

STATE HIGHWAYS

New Jersey has spent millions to modernize her highways. In many cases they follow the Indian trails along which the early settlers made their perilous way. These first roads, made by Indians and wild animals, were merely winding paths beside the streams in the dense forests. Wagons were unknown, and the early inhabitants went afoot or on horseback. Most of the commerce was carried on waterways.

The first highways in the State extended north and west along the valleys of the Passaic

and Hackensack Rivers. The settlements of Hackensack and Passaic were connected by a narrow road that led into Newark. From there a road went through Elizabethtown, Elizabethport and Amboy to New Brunswick. In West Jersey a road connected Trenton with Newton, Burlington, Salem, and Bridgeton. An old trail joined New Brunswick and Trenton. It was not until 1695 that the legislators ordered public roads constructed between the important towns.

In the early days of the Province the need for certain trunk-line highways became evident. To meet this need there were established certain Great Roads, or King's Highways, by decree of the rulers, or by King's grant. Portions of these roads are still in existence and they form parts of the State and County Highway Systems.

Prior to 1891, the county, township or municipality having jurisdiction over any particular highway was charged with its construction and maintenance, and funds had to be provided entirely from local sources. The need, of course, for improved roads was not then so urgent as it became with the advent of the motor vehicle.

The first Public Road Act in New Jersey carrying a provision for the granting of aid in the construction of roads, was passed in 1891, but did not become effective, due to a defect, until amended in 1892. The plan of State Aid to counties and municipalities in the construction of their roads, was administered by the president of the Board of Agriculture until 1894, when a Commissioner of Public Roads was appointed, to serve for a three-year term.

The percentage of aid granted by the State on approved construction was first 33⅓ per cent. This was later changed by Chapter 395, Laws of 1912, to a 40 per cent share of the cost. In 1906 the act providing for the use of the receipts from motor vehicle licenses, fees and fines, as aid to counties and municipalities in the repair and maintenance of roads, became effective.

In 1912 the "Convict Labor Law," Chapter 223, Laws of 1912, was passed. It provided that

ONE OF THE DELIGHTFUL VISTAS IN THE PEQUEST RIVER VALLEY
The State Highway follows the river for miles

STATE HIGHWAY ROUTE NO. 9 BETWEEN CLINTON AND PERRYVILLE
On the through-route from Elizabeth to Phillipsburg

RANSOM CONCRETE MIXER MADE IN DUNELLEN AND AT WORK ON A NEW JERSEY STATE HIGHWAY

the Commissioner of Public Roads might employ prisoners in the repair and construction of roads and many miles have been built by this means.

Procedure under these several acts was followed without vital changes in legislation until 1916. Chapter 285, Laws of 1916, popularly known as the "Egan Act," was passed by the Legislature and approved, March 31, 1916. This act provided for the issuance of bonds in a sum not to exceed $7,000,000, the proceeds to be used for the construction of a State Highway System comprising 13 routes as therein listed, the bonds to be retired by the use of Motor Vehicle Funds. This act further provided for the creation of a Highway Commission.

The then Commissioner of Public Roads, Colonel Edwin A. Stevens, called the attention of the Attorney General to the fact that the amount provided in the act was not sufficient to meet the cost of construction of the system of highways that it ordered built and the Attorney General advised him, therefore, that the provisions of the Egan Act could not become operative.

At the 1917 session of the Legislature the "Edge Acts" were passed, Chapter 14 defining the State Highway System, Chapter 15 providing for the appointment of a State Highway Commission and the establishment of a State Highway Department, and Chapter 16 providing for the levying and collecting of a tax of one mill on each dollar of the ratables of the State, the proceeds to be used in the construction of the highways included in the State Highway System.

The 1917 Legislature also passed Chapter 98, providing for a State Engineer. Under this act General George W. Goethals was appointed and the State Highway Department was organized and operated under his direction until he was called into service by the World War.

The State Highway Commission originally comprised eight members serving without pay until 1921 when, by Chapter 336, of that year, the salary of each was made $4,000.

At the session of the Legislature of 1922 a bond issue of $40,000,000 was voted for the extension and construction of State Highways during the next five years. Further provision was made that the receipts from the mill tax should be used to pay the carrying and retirement charges of the highway bonds.

In 1923, the State Highway Commission was reduced to four members,—no more than two to belong to the same political party. Salaries of the commissioners were raised to $7,500 a year. This plan is still in effect.

The State Highway System, as originally adopted in 1917, included approximately 525 miles, the State Highway Commission having sole jurisdiction over their construction and maintenance. The roads taken over under the authority of amendments and supplements to the State Highway Act up to and including 1926 increased the mileage to 890 miles.

The 1926 session of the Legislature adopted a resolution directing the State Highway Commission to prepare a report with recommendations covering a comprehensive highway system, and this report was presented in 1927. During the session of the latter year a greatly enlarged State Highway System, comprising more than 1,800 miles, was voted. Laws were passed providing for a bond issue of $30,000,000, a gasolene tax of two cents per gallon, and the use of other moneys for State Highway construction, improvement, reconstruction and repair.

It is estimated that the completion of the comprehensive highway system as now ordered will require approximately six and one-half years from the date of approval of the act, and it is further estimated that the sources of income as provided in the act will produce a total revenue of approximately $162,000,000 during that period. A table at the end of the section on Revenue and Taxation in Chapter I of this book reveals the financial results of this legislation in interesting detail.

Chapter 112, Laws of 1928, revives the provisions of Chapter 183, Laws of 1918, whereby the State Highway Commission may make agreements with counties, or municipalities, to construct portions of the State Highway System and to reimburse such counties, or municipalities, for the cost of the work. This Act is intended to facilitate the completion of the big program of the Commission.

New Jersey's traffic problem is complex. The eastern border for more than 120 miles along

STATE HIGHWAY ROUTE 9
Bloomsbury to West Portal. Warren and Hunterdon Counties

STATE HIGHWAY ROUTE 18
Lemoine Avenue Extension. Bergen County

STATE HIGHWAY ROUTE 5
Morristown to Convent. Morris County

STATE HIGHWAY ROUTE 6
Budd Lake to Hackettstown. Morris County

the Atlantic Ocean is a great resort drawing the people of this and other States in numbers that tax highway capacity.

The great metropolitan areas of New York and Philadelphia, only 90 miles apart, spread out into New Jersey territory with two effects upon traffic,—first, a heavy, through commercial and bus traffic; and second, a traffic created by the extensively populated suburban areas. All this is in addition to the traffic incident to that developed by the industries and agriculture of the State.

There is superimposed upon the traffic of a manufacturing and agricultural State a flood of other traffic growing out of special conditions. The latter stream is highly seasonal and varies in volume greatly from day to day—creating peaks that must be met in providing highway capacity. Again, vehicles coming into New Jersey from New York or Philadelphia reach it by bridge, ferries, and tunnel through densely populated, highly developed districts. This compels highway construction of a difficult and expensive type in order to avoid congestion at the entrances and exits. Facilities for these peaks of traffic must be provided over a considerable part of the State in much the same way as in the larger cities.

The traffic increase incident to completion of the Holland Tunnel and the Camden Bridge presented the most difficult problems. It required highway construction on a scale beyond that ordinarily attempted. The highway leading from the tunnel plaza in Jersey City through Kearny and Newark to a point beyond Elizabeth, approximately 13 miles, will cost about $30,000,000. For the eight miles from the plaza to Haynes Street, Newark, there are no grade crossings. All connections to main city streets and intersecting county highways are over ramps. The United States Department of Roads has aptly referred to this highway as the "Super-Highway of the World."

In Camden a belt known as Crescent Highway, has a paved width of 56 feet. It connects the principal traffic arteries entering the city. From this a boulevard about 2½ miles long, paved 78 feet in width, leads to the Camden-Philadelphia Suspension Bridge Plaza. It is estimated that the maximum-hour traffic over this boulevard will be 6,150 vehicles, which is slightly in excess of that expected for the highway leading from the Holland Tunnel. The Camden State Highway units involve about 12 miles of new construction estimated to cost $6,000,000.

In addition to these outstanding State Highway creations there is the 55 mile White Horse Pike, a four-car width concrete road from Camden to Atlantic City. The Lincoln Highway from Jersey City to Trenton, another 55 miles across the State, carries the heaviest trucking traffic, while the great highway from Newark to Asbury Park claims the record count of motor vehicles of all types.

Other through-routes of the most modern construction connect Phillipsburg with the eastern cities of the State via Washington and Hackettstown, and via Lebanon and Bound Brook. Each follows rushing streams through charming valleys and climbs mountains that reveal enchanting views. Linking these and other main highways are numerous State routes that form a net-work of roads with modern cut-offs, viaducts, bridges, and lanes for as many as six cars abreast in some places.

TRUCKING

Industrial New Jersey has benefited greatly through the use of motor trucks. At present there are only 6 States showing greater totals of truck registrations. In 1918, there were 26,134 trucks in New Jersey. By July 1, 1927, the figure had jumped to 125,886. Of this number 11,378 were owned by farmers; 82 per cent were privately owned; 11 per cent belonged to contract carriers, and the remaining 7 per cent were operated for hire. There were 14,368 fleets of two or more trucks, including 438 fleets of 10 or more.

From a recent survey of the State Highway Department, it was found that of the total vehicles using our highways on week days, 22 per cent are commercial—either trucks or

buses. On Sunday this percentage drops to approximately 5 per cent, which is a definite indication that the Sunday peaks are created by the increased use of the pleasure vehicle.

The farmer has found that by the use of the truck he can send his foodstuffs to a more favorable market in a shorter time and to a greater distance. With the large farm area in this State, foodstuffs from southern Jersey are trucked to both the New York and the Philadelphia markets, while the northern part of the State sends its produce by truck to Newark and New York.

New Jersey, located between New York and Philadelphia, affords her merchants an opportunity to carry smaller inventories, and by the use of trucks secure a sufficient stock for their needs. Manufacturers are also using the trucks for the delivery of their products.

Throughout the State, new homes are being built and small country communities increased by the use of the automobile and bus. The city dweller is living in the suburbs and commuting to his business. This change in living conditions has been expedited by the trucks that have carried the home-building materials efficiently and rapidly.

AVIATION

The development of aviation has had its fitting response in activities in New Jersey. One company manufactures aircraft, another builds engines and others carry passengers and goods, the services ranging from short pleasure flights to the long-distance carriage of mail to and from Jersey air fields. The United States Navy maintains a dirigible station at Lakehurst.

The Wright Aeronautical Corporation at Paterson does not manufacture airplanes, but concentrates on the production and development of aeronautical engines. It builds one commercial engine—the 200-horsepower, nine-cylinder, air-cooled Wright "Whirlwind." It also builds the 525-horsepower, air-cooled Wright "Cyclone" engine exclusively for the Government, but expects to release it for commercial sale. Two airplanes are used exclusively for company purposes. At the hangar at Teterboro considerable testing and service work is done.

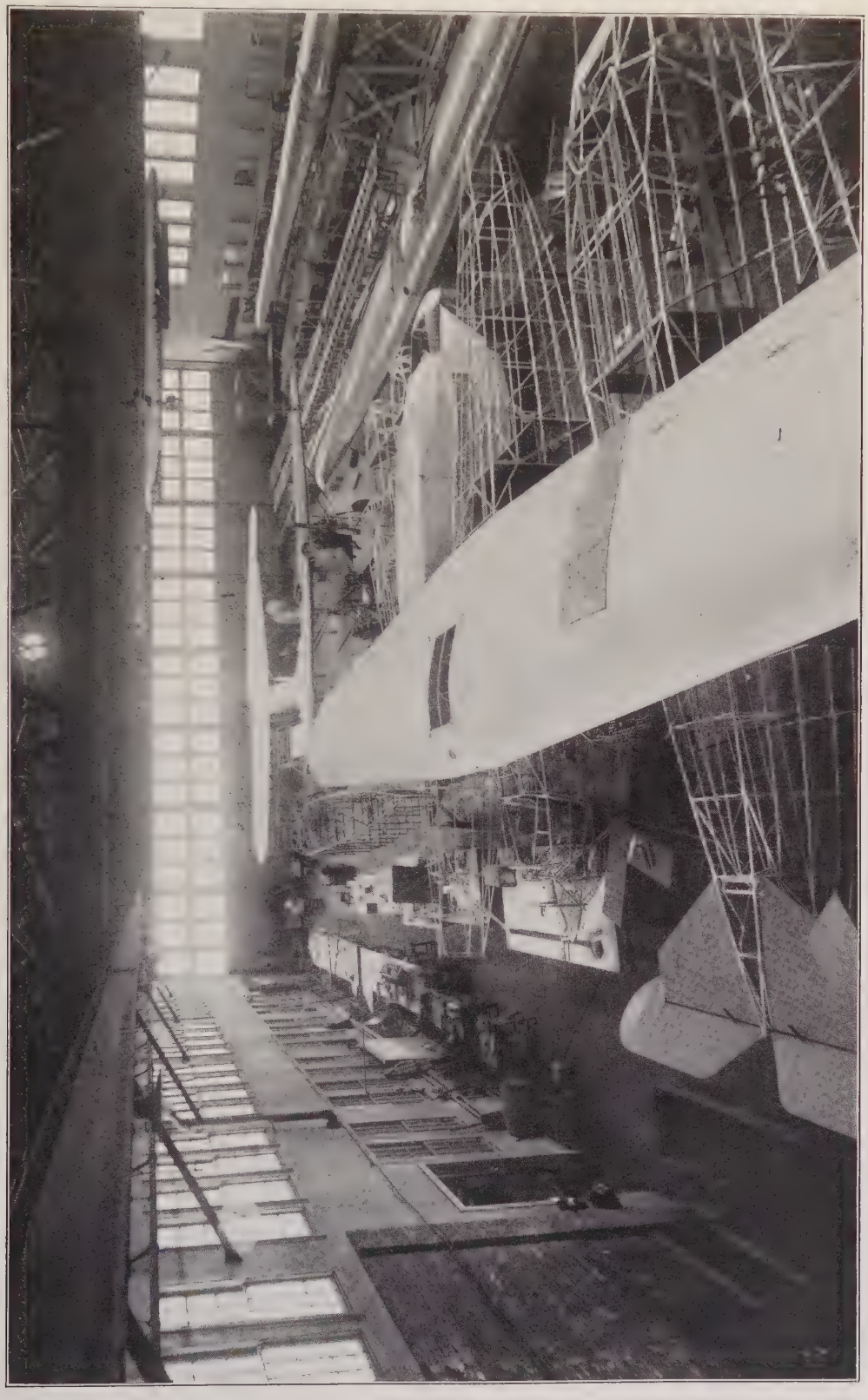
The Atlantic Aircraft Corporation in its factory at Teterboro, Hasbrouck Heights, builds the Fokker airplane and uses the Teterboro Airport as a testing ground. The Atlantic and the Wright corporations, with Walter C. Teter, are the owners of the airport. Located in Hasbrouck Heights, at the upper end of the Hackensack meadows, the field comprises 200 acres. There are three 2000-foot runways, two at right angles, and the third bisecting the angle; and because a plane may start at either end of any of them, they may be said to extend in six directions.

The Gates Flying Circus and Aviation Corporation of Newark has been in business about 17 years and operates the flying circus on tour. This circus has four four-passenger planes, with trucks, supplies, and automobiles, making it virtually a moving aerodrome. It has been in forty-three states. The concern also operates the commercial flying at Teterboro Airport.

It has transported approximately a million passengers with but one fatality. The Gates-Day Aircraft Corporation now owns the flying circus and is a new manufacturing enterprise building a five-place, open cockpit, sesquiplane, to sell at a very low price for commercial operators.

The Seaboard Airways operates between Teterboro Field and Washington, its terminus there being at the Washington Airport, at the South End Highway Bridge. The planes used on this line are sister planes to the "Spirit of St. Louis." The cabins hold four passengers, who may wear their ordinary clothes. They are powered with Wright Whirlwind motors, with double ignition.

The National Air Transport operates contract air mail route No. 17 between Chicago and Hadley Field, New Brunswick. On this the only regular stop is at Cleveland—Bryan, Ohio, and Bellefonte, Pa., are both emergency



HASBROUCK HEIGHTS FACTORY WHERE THE ATLANTIC AIRCRAFT CORPORATION BUILDS THE FOKKER AIRPLANE

fields, where pilots may land to refuel or to await clearer weather. There are a number of others along the route at which revolving beacons are placed, but the pilots do not land at these except in an emergency. Passengers are carried between New York and Cleveland and Chicago in the regular mail and express planes leaving Hadley Field. These planes fly 5,000 miles every 24 hours.

The National Air Transport is the largest air transport company in the United States and the second largest in the world. Its planes have flown a total of 1,500,000 miles. It owns 18 Douglas airplanes which it took over from the Government when it assumed the operation of the New York-Chicago air mail line; eight Travel Air monoplanes with mail and express facilities and an enclosed cabin for passengers; seven Curtiss Carrier Pigeons equipped for handling mail and express; one Aerial Mercury and one Stout all-metal monoplane of the cabin type, equipped with three Wright engines and having accommodations for eight passengers and two operators. In the operating department are two division superintendents, 11 field managers, 23 pilots and 52 mechanics. The operating department maintains a repair depot, employing 10 men, and an engine overhaul shop.

Eight planes make the trip daily between New Brunswick and Chicago. Planes and pilots are changed at Cleveland. The Liberty engines used in the Douglas planes between Chicago and New Brunswick and in the Curtiss Carrier Pigeons are overhauled after every 150 hours of flying. The Wright Whirlwind air-cooled engines used in the Travel Airs and in the Stout plane are overhauled every 250 hours.

The express traffic handled by the National Air Transport, while still the smaller part of the business, is increasing steadily. The company acts merely as the carrier, the American Railway Express company handling the solicitation of traffic and the transportation of cargoes to and from the flying field.

Hadley Field is at present the "clearing house" for all of New York's air mail but this business will be transferred to Newark Airport when the latter is ready.

The Colonial Air Transport operates an air mail route known as Contract Air Mail No. 1 between New York and Boston, making a trip each way daily and stopping on each trip at Hartford, Conn. The planes carry air express as well as air mail. They do not carry passengers owing to the fact that during the winter months the route necessitates night flying almost entirely, and the airport terminal at Hadley Field is not convenient for passengers coming from Boston to New York. The Hartford port is known as Brainard Field. The Boston Airport is still in the process of development.

At Hadley Field the Reynolds Airways conducts aviation activities. It carries passengers for short rides and instruction and does general cross-country work and aerial photography; and carries newspaper and movie films of big events. It operates no schedule runs. The business is more of an air-taxi service.

The Government Weather Bureau maintains a station here, with a radio telegraph for airplane dispatching. There is also a "radio beacon," a link in the government system of "beams" across the State to inform the aviator whether he is following his true course.

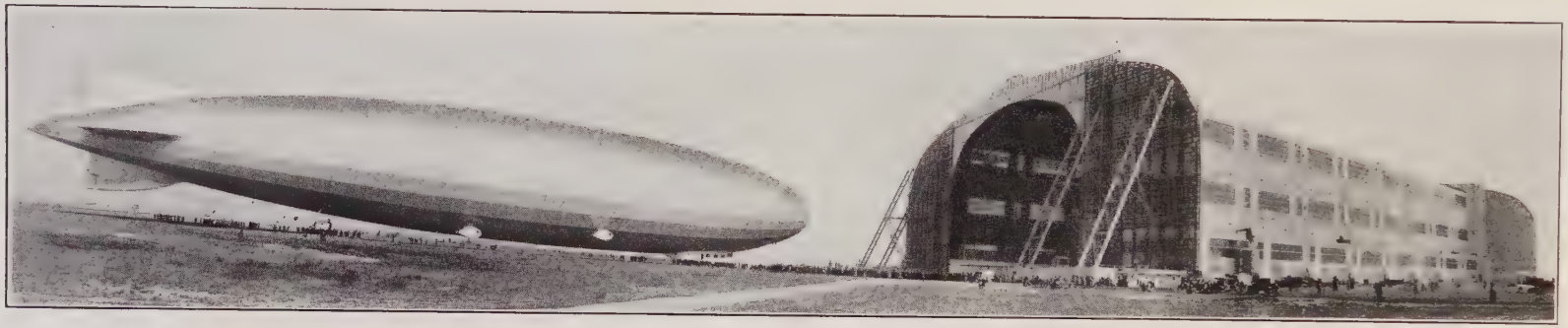
An important feature of Hadley Field is its proximity to two main highways, with a connecting paved road, and five trunkline railways, with 249 trains a day. There are hangars to accommodate mail planes and transients. Fifty boundary lights mark its edges. Red obstruction lights give the signal above nearby buildings. Green lights mark the best approaches. There are two floodlights, the largest illuminating a semi-circle with a 3,600 feet radius—more than half a mile.

The Miller Corporation at its New Brunswick airport has a field with two runways, one 2,900 feet long and the other 1,500 feet, where flight instruction is given and passengers are taken for short rides.

Newark Airport, when finished, will be the largest and best airport in the New York area. It is a municipal project owned by Newark but built with the cooperation of the United States Department of Commerce. It is on a site selected by the committee appointed by the Secretary of Commerce, Herbert C. Hoover, to make a survey of the metropolitan district and

THIS IS THE PLANE IN WHICH COLONEL CHARLES A. LINDBERGH MADE HIS FAMOUS FLIGHT FROM NEW YORK TO PARIS IN 1927
It was equipped with a Wright motor made in Paterson

BALLOONS AND BLIMP
Naval Station at Lakehurst—used for observation and instruction



LOS ANGELES, SECOND LARGEST DIRIGIBLE
Entering the Lakehurst hangar of the United States Navy, which is the world's largest building—40,000,000 cubic feet

recommend desirable airway terminals. When completed it will cost $6,000,000.

The airport is adjacent to the city in the Port Newark district. Mail can be relayed by truck to the up-town post office in New York in 33 minutes, or to the down-town post office, via the Holland Tunnel, in 20 minutes. It can be sent to the Newark post office in 10 minutes.

The largest hangar will be 700 feet wide and it will have a paved take-off strip down the center 200 feet wide and a runway 2,200 feet long. It will have a cross runway forming a maltese cross with the first runway. The municipal hangar will be 120 feet square and its doors will afford a 30-foot clearance. The walls of the latter will be partly of brick but mostly of shatter-proof glass, providing practical daylight conditions inside. The roof will be of chrome yellow, a color selected because of its high visibility.

Newark's airport is being constructed on reclaimed salt marsh land. When completed, it will cover 500 acres. It will be lighted by a three-unit flood-lighting project, supplemented by three beacons, two fog-penetrating neon lights and one revolving beacon. The usual border lights will be installed and red lights will be mounted on tall chimneys in the vicinity. There will be a 60-foot dirigible mooring mast.

The U. S. Naval Air Station

The United States Naval Air Station is located one mile northeast of Lakehurst, New Jersey, on the Lakehurst-Lakewood Road. Lakehurst, due to its position on the east coast, was chosen as a base for erection of a hangar capable of housing two airships of the U.S.S. "Shenandoah" design. Work on the hangar was begun in 1919 and completed in the fall of 1920.

Grouped at this station are all the lighter-than-air activities of the United States Navy. Here is the home of the great airship "Los Angeles." Here the "Shenandoah," our first American rigid airship, was assembled, tested and operated. In addition to the rigids, for purposes of instruction and development, non-rigids are flown, the largest of which is the J-4. Other aeronautical activities of the station are the development of, and experiments with, kite and free balloons. All the parachutes for the entire naval service are tested here and a parachute school for personnel is maintained.

The hangar is a gigantic single room, 806 feet long, 348 feet wide and 202 feet high, containing over all about 40,000,000 cubic feet. Almost three Woolworth Buildings (13,000,000 cubic feet) could be housed in this hangar. It is the largest single building in the world. It cost about $3,600,000 and is so strongly constructed that it can withstand a hundred-mile gale.

The heavy doors slide to the side on tracks, and are operated by electric motors. The door clearance is 170 feet,—the height of a 15-story building. The walls are of asbestos composition to keep out the heat rays which have a

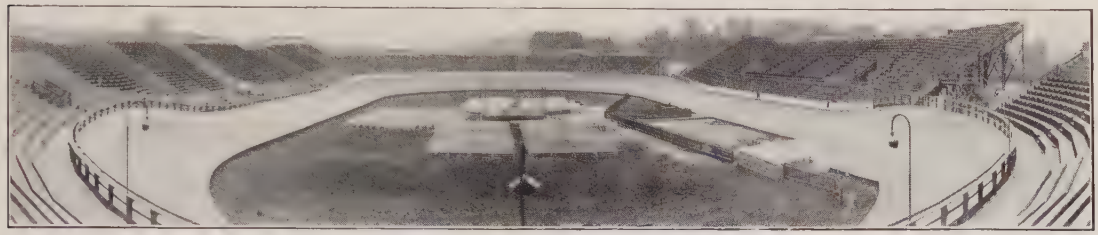
GRAF ZEPPELIN, THE COMMERCIAL DIRIGIBLE THAT MADE THE OVERSEA TRIP FROM GERMANY IN OCTOBER, 1928, UNDERGOING REPAIRS AT LAKEHURST UPON ARRIVAL IN THE UNITED STATES
Los Angeles at center, Graf Zeppelin at right

decided effect on the lift of a rigid airship. The hangar will house two great rigids and several non-rigids. One must see this hangar to appreciate its immensity. The Graf Zeppelin was housed in it during her first stay in America in October, 1928.

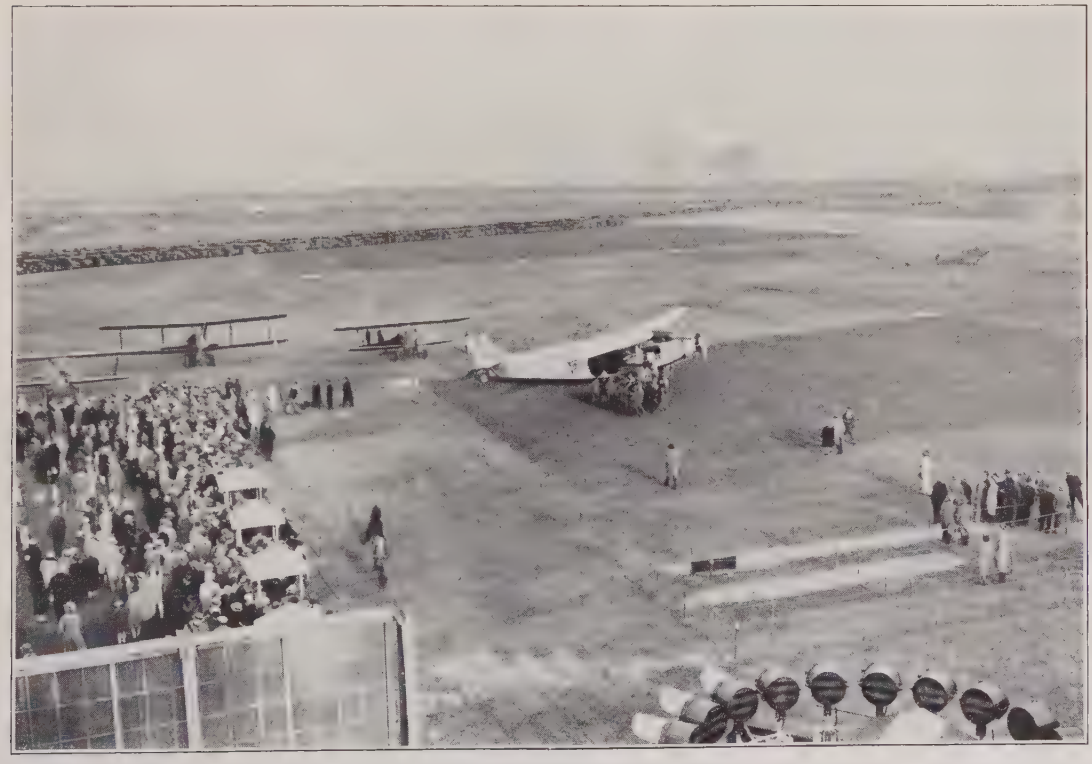
The flying field of this Naval Station is 1,502 acres in area and is one of the largest in the world. At a cost of $6,000,000 the station gradually developed to its present size. With its huge hangar, two mooring masts, the aerological observatory (complete weather bureau), the helium purification plant, and shops for repairs and engine overhaul, it has every modern facility for the service of all types of lighter-than-air craft.

The mooring mast is about 170 feet high, furnishing the rigids with an elevated mooring cone. Only 15 men are required to moor a ship, though at times more than 100 are required to take the Los Angeles out into the open and free her for a cruise. Elevator and pipe lines furnish facilities for the supply of helium, gasoline, water, personnel and food while the ship is moored, swinging to the wind.

Operation of the various ships and plant requires approximately 50 officers, 400 enlisted men, 100 civilian workmen, and 50 Marines.



NEWARK VELODROME BICYCLE-TRACK AND BOXING ARENA
Still a famous bicycle race-track in constant use



NEWARK AIRPORT
Soon to be the Eastern terminus of the trans-continental air mails. Under construction by the City of Newark and planned for extensive commercial use. Covers 500 acres. Completed cost, $6,000,000

BEACH AND BOARDWALK AT WILDWOOD—LARGEST OF THE SOUTHERNMOST SHORE RESORTS
The boardwalk is five miles long. Wildwood does a great deal to entertain its summer visitors

ASBURY PARK, GEM OF THE NORTH SHORE RESORTS

ATLANTIC CITY, PLAYGROUND OF THE WORLD

Chapter VIII

The Great Beaches

ATLANTIC CITY, PLAYGROUND OF THE WORLD

The New Jersey coast is the great playground of this country and a favorite of cosmopolites who know the world's best recreation spots. Along the 120 miles from Sandy Hook to Cape May are 40 excellent bathing beaches and behind them many inlets and bays with ideal conditions for fishing and yachting. Compared with other sections, climatic conditions in New Jersey are highly favorable throughout the year. The pre-eminent position of Atlantic City, "Playground of the World," as the most popular all-year recreation center, as a resort where ozone-filled air possesses recognized therapeutic value, as a delightful residential community, and as a convention city of the first rank, is firmly established.

Yesterday, in a historic sense, Atlantic City's 16,000 acres were a low-lying and sandy solitude visited occasionally by a few roving Indians. Today this ground is covered by a gorgeous city, extending six miles along a wonderful, flat and smooth beach visited yearly by millions. The permanent population is about 67,000, but its visitors reach 12,000,000 a year. Atlantic City has commission government and an assessed valuation of over $300,000,000. It is connected with the mainland by such magnificent motor roads as the White Horse Pike, Harding Highway and the Shore Road to northern points. Five miles out in the ocean on Absecon Island, it has a climate conducive to good health. Snow falls occasionally but does not remain. Cooling breezes from the ocean moderate the heat in summer. Days of sunshine average high.

The hotels number more than 1200. They meet the most exacting demands for elegance and comfort. Along the ocean's edge they rise massively and majestically and provide a fitting setting for the kaleidoscopic panorama which stretches before them.

The famous Boardwalk of Atlantic City, extending eight miles along the beach, has a 60-foot width, overlooks the ocean at every point and rivals in brilliancy the gayest thoroughfares of the world. In itself the Boardwalk is a most facinating recreation and diversion. The vivacity and modernity of scene and action allure the eye of every visitor, and Atlantic City is encompassed by a constant holiday atmosphere. Inseparably associated with the Boardwalk life, the roller-chairs are a popular and dallying pleasure.

Unique among world institutions of this kind, the Boardwalk is described as analogous to the deck of an immense ocean liner, for the impression of being far out at sea is enhanced by the many "steamer decks" with their "steamer chairs" at the second-story level, all overlooking boardwalk and ocean. Exhibits of merchandise and manufactured products line the miles of boardwalk. They are maintained for national advertising purposes, since people come here from everywhere.

The six great ocean piers whose names—the Heinz, Garden, Steel, Steeplechase, Central and Million Dollar—arouse memories in millions of minds, are among the most popular attractions. They furnish concerts by famous bands, motion pictures, vaudeville, minstrels, dancing, deep-sea net hauls, and just the still and far-out watching of the waves and the moon. They also house many large conventions. The newest convention hall will seat 50,000 and has 250,000 square feet for exhibition space.

In the waters of Atlantic City the fisherman finds his ambitions sated. Crabbing is a favorite pastime. The organized amateur fishing life

WAITING FOR BOARDWALK DEDICATION PARADE—OCEAN CITY

HOLIDAY CROWD ON THE BEACH—WILDWOOD

EASTER SUNDAY PARADE ON THE BOARDWALK—ATLANTIC CITY

EVERYDAY CROWDS IN SUMMER—ASBURY PARK

of Atlantic City is centered in the Anglers' Club with its pier and club house. There are nearby opportunities for gunning also. Inland waterways supply reedbirds, ducks, yellowlegs, plover, and geese for the sportsman.

Varied and excellent golfing is available on the mainland a few miles back from the city. The Atlantic City Country Club, the Linwood Country Club and the Seaview Golf Club each has an 18-hole course. Golf is played here every month in the year, and all the clubs are accessible. Tennis courts are kept in condition by the city. Yachting is represented in Atlantic City by four yacht clubs and a large fleet of speedy and picturesque motor and sailing craft.

Horseback riding along the beach at low tide is popular. Hydroplanes from the "Inlet" municipal aviation station are increasingly popular. Viewing Atlantic City from the air is a pastime for visitors. The beach patrol is maintained by the municipality. There are in the summer season 100 trained guards, with ambulance service and hospital stations.

Brigantine Beach is a notable development and possesses many of Atlantic City's natural advantages. This new seaside beach resort is one mile across the inlet from Atlantic City. It is connected with the mainland by a bridge 1760 feet long and 30 feet wide.

From Bay Head on the north to Beach Haven on the south stretches the attractive sheet of water of Barnegat Bay. Varying in width from three to six miles, Barnegat Bay offers facilities for boating, fishing, sailing, crabbing, and hunting such as are rarely found. Along the eastern ocean side of the bay for a distance of about 50 miles extends a narrow strip of land upon which many thriving and progressive seashore resorts are located. Picturesque and abundant in shadow trees is Island Heights. Attractive and rich in facilities for sailing, fishing, and hunting is Seaside Park. Beach Haven and Bay Head are summer resorts of interest on Long Beach and Barnegat Bay. Historic Barnegat light, built in 1835, rises 161 feet above the sea.

ASBURY PARK AND THE NORTHERN RESORTS

Well placed on the northern stretch of New Jersey's ocean shore is Asbury Park, with its faultless public parks and its well groomed and shaded streets. This widely loved resort community has a permanent population of 12,000, and its seasonal devotees enthusiastically swell this to hundreds of thousands more. The city's entire beachfront is municipally owned. This came about when the founder of Asbury Park, James A. Bradley, deeded it to the municipality nearly a half century ago. There are theaters, hotels, schools, libraries, paved streets, and all the equipment of a modern city, where the stranger expects to find the sandy shore with a few clustering rows of houses. Interlaken, Allenhurst, and Deal, beautiful adjoining towns, have equal facilities for pleasure and comfort. They are noted for hundreds of America's finest summer estates.

In the summer season the boardwalk of Asbury Park is the most favored mecca of the northern Jersey coast. A fireproof natatorium, numerous shops, and many amusements are among its attractions. Asbury Park has been called "The Resort of a Thousand Delights" because of its diversified recreations. Picturesque lakes for canoeing and boating, launch rides, motor car rides, dance halls, tennis, golf, baseball, bowling, and children's sports make vacation here a round of pleasure.

One of the many natural beauties of Asbury Park is Sunset Lake. A short distance to the south there are located Fletcher Lake, Sylvan Lake, Wreck Pond, Shark River, and Manasquan River.

To the south of Asbury Park, separated only by Wesley Lake, Ocean Grove is located. This is a picturesque, clean, wholesome resort with wide-shaded streets. Ocean Grove was founded as a camp-meeting resort in 1869 by Methodists. Since that time it has continued its successful history as one of America's leading "camp-meeting resorts." In August the Metho-

BOARDWALK AND BEACH AT LONG BRANCH IN OCTOBER, WHEN THE CROWDS ARE GONE
Shows section of the unsurpassed 30-mile ocean boulevard

dist Congress is held here and attracts tens of thousands from all sections of the country. Its famous auditorium seats 10,000 persons.

Among numerous lesser beaches and seashore resorts of the same section are Long Branch, with the Shrewsbury River at its back and the broad ocean in front. West End, Hollywood, and Elberon are included in its corporate limits. It is one of the oldest and best-known resorts along the fashionable North Jersey coast and is proud of the fact that it has been the summer home of four presidents of the United States. The charm of Long Branch is in its cottage life, amplified by several good hotels. The resort has five miles of ocean front and it is tempered by ocean breezes. Opportunities for outdoor sports are abundant and include golf courses, clubhouses, tennis courts, swimming pools and fishing. Long Branch once vied with Newport as the home of Eastern fashion.

To the north and at the point where Sandy Hook juts out from the shore line is Atlantic Highlands, from which one gets a wonderful view of the sea and Lower New York Bay. The lights on Navesink throw their beams far out to sea from the highest point on the Atlantic Coast south of Maine.

CAPE MAY AND THE SOUTHERN OCEAN FRONT

Cape May County, where the southern end of the State parts Delaware Bay from the Atlantic, enjoys climatic conditions which place it properly on a par with some of the Southern states. Snowfall of any depth is a curiosity. It seldom lasts more than a few hours. Cape May County contains some of New Jersey's oldest resorts, set beside 40 miles of gently sloping beaches. Here are situated Cape May City, Wildwood, North Wild-

wood, Wildwood Crest, Sea Isle City, Avalon, Stone Harbor, Strathmere, and Ocean City. The county is delightfully placed at the extreme tip of a narrow peninsula that extends for 20 miles along the ocean and around into the bay.

Cape May City is farthest to the south of any settlement in the State. It is in the latitude of Washington, D. C., but seldom has an uncomfortably hot day. It is located almost at the tip of the cape that bears its name. The Dutch navigator, Captain Mey, sighted the point in 1614. The permanent homes form a quaint and pretty settlement and it entertains a comfortable type of summer population. Its leading hotel has an exceptional ocean outlook.

Many of Cape May's vacationists and those responsible for its social charm are from Baltimore, Washington, and the Southern states. Some of the older hotels and cottages still demonstrate, in their colonial type of architecture, the tastes of earlier visitors. There are good modern hotels.

Golf and yacht clubs, good roads and diversified amusements abound. Bathing is safe and pleasant on a wide, smooth and hard beach that is nearly flat.

Ocean City, "Cameo of Cape May," is on an island eight miles long. It is ten miles to the south of Atlantic City. In 1879 Simon Lake purchased Peck's Beach, the island on which it stands. In the 48 years of its existence Ocean City has grown normally and naturally, and is more particularly a home resort for summer vacationists, although it has several good hotels.

There are eight miles of bathing beach. Out of these eight miles the city has selected the best portions and established protected beaches. They are patrolled by efficient lifeguards. There has never been a life lost on a protected beach in Ocean City. Each year an increasing multitude of visitors and vacationists attest its growing popularity.

Ocean City has a fine new boardwalk, replacing the one destroyed by fire early in 1928. It was dedicated July 4, 1928, with one of the most striking of the many beach pageants for

A SUNDAY AFTERNOON ON ONE OF THE LONG, STRAIGHT STRETCHES OF THE ATLANTIC CITY BOARDWALK

CAPE MAY CITY BOULEVARD AND BOARDWALK, LOOKING SOUTH

Cape May City is noted for its charming, though modest, homes and their well-kept grounds

which all New Jersey Coast resorts are annually noted.

Wildwood has a five-mile boardwalk with ocean piers. It has one of the newest and best hotels on the Jersey Coast. It has a double advantage in the way of cool breezes from all directions, since it is not far from the tip of Cape May. The peninsula in the rear is but six miles wide and on the other side Delaware Bay is 30 miles across. On a smaller scale Wildwood, like Ocean City, possesses most of the aspects of Atlantic City. Theaters, piers, a newly erected half-million-dollar convention hall, roller coasters, and other amusements provide a variety of entertainment to all vacationists.

An 18-hole golf course open throughout the year is at the disposal of visiting golfers. Hereford Inlet and the ramifications of the watercourses between the resort and the mainland provide boating, crabbing, and channel fishing.

The permanent population of Wildwood is 14,800. The approximate summer population is 250,000. Just to the south, on the same stretch of beach, is Wildwood Crest. To the north are Stone Harbor, famous for motor-boating, and Avalon for sound fishing, quieter yet pleasant spots that appeal to vacationists.

HIGHLANDS

A popular resort beneath the bluffs from which famous "Highland Light" guides the mariner to New York Bay. Land-end of Sandy Hook is in the distance

WEEQUAHIC PARK HORSE-RACING TRACK AND COURTS FOR SPORTS—NEWARK

It is an Essex County Reservation and immensely popular

OCEAN CITY'S NEW BOARDWALK, DEDICATED JULY 4, 1928
Rep.aces one destroyed by fire earlier in the year. Ocean City has a quite permanent home-owning summer population

Chapter IX

Community Life and Recreation

PARKS AND PLAYGROUNDS

Palisades Interstate Park

The Palisades Interstate Park of New Jersey and New York is one of the greatest public playgrounds in the world. It is the most notable example in the United States of interstate cooperation for the conservation of an outstanding scenic feature. The beauty and majesty of the Palisades, located wholly on the New Jersey side of the Hudson River, inspired men and women to save them, for the perpetual enjoyment of all. This effort has led to the extension of the Interstate Park up the west bank of the Hudson, to the saving of Hook Mountain of equal character and grandeur, and to the inclusion of the great Harriman State Park in the Highlands of the Hudson as a wilderness preserve.

For years there was public agitation against the despoliation of the Palisades by quarrymen, but the New Jersey State Federation of Women's Clubs was the first to take effective action. The Federation appealed to the Governor of New Jersey and he appointed an investigating commission of five. This commission comprised Mrs. John A. Holland, then president of the Federation, and four others. It was enthusiastically aided by organizations in New York. Combined efforts in the two States brought about the creation of the Palisades Park Commission with power to acquire land from joint State appropriations.

The commission began work in the spring of 1900 with only $15,000; $5,000 from New Jersey and $10,000 from New York. George W. Perkins was chosen President of the New York commission and served until his death in 1920. His enthusiasm and his understanding of the needs of the people for outdoor recreation and of the need for conserving the scenery and forests nature had placed so near a population exceeding ten millions, made him the mainspring of the commission.

With the $5,000 appropriated by New Jersey a systematic survey of the area proposed for acquisition was made. The land holdings were numerous and complicated, the New Jersey frontage on the river including 147 parcels held by 112 different owners. With the survey completed, the commission set to work to stop the quarrying, which was going on with feverish speed in anticipation of possible forced cessation. The big quarry north of Fort Lee Bluff, where 12,000 cubic yards of trap rock were being blasted away daily, was secured for $132,500, and New York's $10,000 was used to bind an option on it. Mr. Perkins appealed to J. Pierpont Morgan, the elder, and Mr. Morgan donated the $122,500 required for completion of the purchase. In the same year, New Jersey appropriated $50,000 and New York $400,000, for additional land purchases. About $540,000 was expended in acquisition of land, riparian rights and improvements. The gift of 60 acres of land along the shore and cliffs above Alpine and 3,000 feet of riparian rights by Mr. and Mrs. Hamilton McKay Twombly, was the final step to complete the desired frontage from Fort Lee to the New York state line.

Subsequent appropriations and land donations have brought the contribution of New Jersey up to $2,100,000. New York State in like manner has donated $11,000,000. Land given by private owners represents another original $8,000,000. The present-day value of the interstate holdings exceeds $50,000,000.

When acquisition of the Palisades was completed, the commission had as raw material thirteen and a half miles of cliffs, badly scarred in places by quarrying, but retaining much of

their original wild and inaccessible character. The formal dedication took place, in September, 1909, at the old house at Alpine landing used in 1776 by General Cornwallis, when he landed his army and climbed the cliffs to drive Washington's forces out of Fort Lee.

The commission cleared the shore front and built a path which has come to be one of the most popular rambles for the city populations. The double hair-pin highway ascent from the Englewood-Dyckman Street ferry was constructed up the cliffs, and the Henry Hudson Drive was carried north along the base of the Palisades to Alpine, with a branch to another vehicular ferry to Yonkers. The drive connects at the top of the cliffs with the newly widened and relocated State Highway, Route number 18, which follows the top of the Palisades, comes out upon the brink two miles north of Alpine and, crossing the State Line into New York State Highway Route No. 3, turns back through the old village of Palisades, N. Y. From here the drive passes over the new steel viaduct at Sparkill constructed by the Palisades Commission and continues up the west bank of the Hudson to Nyack, Rockland Lake, Haverstraw, Stony Point, Bear Mountain, West Point and the Storm King Highway,—now skirting the river edge, now rising over mountains, and combining elements of scenery that make it America's unequalled highway.

Intensive development of the Palisades section of the Interstate Park was carried out in the years following and is still going on. Bathing beaches were established, with bathhouses and lockers at Hazard's Beach, and Undercliff. Motorboat basins and playgrounds were built at Englewood Landing, Forest View Grove and Alpine. North of Forest View to the state line, underneath the 500 foot cliffs of Indian Head, and along the rough, bare talus blocks of the Giant Stairs, where the duck hawk still nests on the crags, the park was left in a natural state. It is accessible only by hikers' trails and remains one of the most entrancing bits of wilderness within an hour of the metropolis.

At the top of the Englewood approach there is a motor tourist camp, which is the only one of its kind so near New York City. Camping is allowed along the Palisades shore front under the cliffs south of Forest View.

A new development planned is the damming of Green Brook, a mile and a half south of Alpine, in a depression back of the escarpment, to make a lake and picnicking area. Here Green Brook leaps down the face of the cliff in a continuous cascade for 300 feet.

The top of the Palisades is accessible from northern New Jersey by many primary and secondary routes from Jersey City, Hoboken, Union City, and Fort Lee, or from Englewood and Hackensack; and the shore front may be reached from the Englewood approach to the Henry Hudson Drive and the ferry approach to Alpine landing. Eventually the drive will be carried south, under the New Jersey approach of the new Hudson River Bridge, to Edgewater.

In addition to the Palisades, New Jersey shares with New York enjoyment of the five New York divisions of the Interstate Park. These are the Blauvelt section, near Blauvelt station on the West Shore Railroad; the Hook Mountain section, along the Hudson between Upper Nyack and Haverstraw; the Bear Mountain and Harriman State Park sections, extending from the Hudson to the Ramapo Valley, and the Storm King section, between West Point and Cornwall.

New Jersey philanthropic organizations are well represented among the hundred camping groups installed in comfortable quarters around the various lakes of these divisions. Many of the groups use their cabins in winter. Hiking clubs from New Jersey and the New York City metropolitan district use the trails and shelters in the Harriman State Park all the year round.

No geographical or geological division exists in the Palisades Interstate Park. It is divided only by an invisible political boundary, and its several divisions, particularly the 43,000 acres of the Harriman State Park, and Bear Mountain Park, are as much New Jersey's as New York's for the perpetual and unrestricted outdoor enjoyment of the people of both states, and of the nation.

This park is much advertised by the excursion boats plying the Hudson River. It is the showplace for tourists from all parts of the world visiting northern New Jersey or New York City.

WHERE THE UPPER REACHES OF THE PALISADES OF THE HUDSON ARE HEAVILY WOODED AND BEAUTIFUL
View in Palisades Interstate Park, owned and maintained jointly by the States of New York and New Jersey

HIGH POINT PARK. HIGHEST MOUNTAIN IN NEW JERSEY. HEIGHT 1823 FEET ABOVE SEA-LEVEL. VIEW TAKEN FROM THE STEPS OF THE STATE BUILDING

The Soldiers and Sailors Memorial is shown under construction at the end of the winding road up the slope

State Parks

High Point Park

The State maintains several charming parks. High Point Park is the largest and derives its name from the highest elevation in the State—1,823 feet—which is in the reservation. The park comprises more than 10,000 acres. It is in the extreme north-western corner of the State at the top of the Kittatinny Range. It borders New York State for a considerable distance, approaching within a few miles of the Pennsylvania line at the point where Tri-State Monument marks the meeting place of all three states.

A panorama of grandeur is unfolded from the great rock at its summit. The view is unbroken in any direction for many miles. Far to the north may be seen the Catskill Mountains of New York State, to the east the Wantage Valley of that State, to the south the rolling hills of northern New Jersey and the Delaware Water Gap, and to the west the Pocono Mountains of Pennsylvania. Twenty-two towns and villages in the three States are visible on a clear day.

Lake Marcia, in the park, is the highest natural spring lake in New Jersey. It is five-eighths of a mile in length, a quarter of a mile across, is situated 1,590 feet above sea level and at places it is 50 feet deep. On its eastern shore it is bordered by an abrupt, craggy elevation of 100 feet.

The State Building is a half-mile from the summit. The building is 1,670 feet above sea-level. A wide, encircling veranda affords a substantial promenade from which the view is inspiring. Water is obtained from an artesian well. The water is pumped to a reservoir near the summit and from thence it is carried by gravity to the State Building. There is a pleasing mile drive through a pine forest from the park entrance up to the building.

Camping sites in the park are free. Hunting is prohibited, hence the park is a sanctuary for many species of wild birds but there are both hunting and fishing grounds close by. There is

a stone road from the lower end of the lake to Cedar Park two miles away where there are 115 acres of a remarkable forest of spruce and cedar and an undergrowth of rhododendron so thick that it can be penetrated only by crawling on the hands and knees.

The entire tract included in High Point Park was the property of Colonel Anthony R. Kuser of Bernardsville up to 1923, when he presented it to the State and it was created a park under Chapter 36 of the Laws of that year. Along with the land, Colonel Kuser presented his mountain home on the estate and it is now occupied as the State Building. Supplementing this magnificent gift to the people of New Jersey, Colonel Kuser recently provided the funds for a monument that will rise 218 feet above the summit of the park. The monument will be a memorial to the soldiers and sailors of New Jersey. It will be 34 feet square at the base, where there will be a platform 84 feet square. From a memorial chamber within there will be a staircase to the top of the monument. The monument is being constructed from native quartzite, quarried near the site, and it will be finished on the outside with granite from a quarry ten miles distant.

Hacklebarney Park

Hacklebarney Memorial State Forest Park, a recent addition to the State Park System, is located in Morris County. It may be reached from Hackettstown over Schooley Mountain and through Long Valley, from Dover by way of Chester, by going north from Lamington, or northwest from Far Hills. It was presented to the State in 1924 by Adolphe Edward Borie and it is making a growing appeal to the public. It is bordered by the Alamatuck River, the waters of which are shiny black.

The park is in a thick forest growth of unusual beauty. The river, and Trout Brook on the opposite side of the park, meet at an apex and add to the woodland vistas. They wind among shady dells, forming here and there trout pools at the base of tumbling water-falls.

Washington Crossing Park

Washington Crossing Park is more than a State Park—it is a National Shrine. It is seven

SHINY BLACK WATERS OF THE ALAMATUCK RIVER IN HACKLEBARNEY STATE PARK
An interesting place to see

ARTISTIC BRIDGE OVER THE WATERWAY IN BRANCH BROOK PARK
One must travel far to find a park so well designed, or maintained, as this Essex County Reservation

miles above Trenton on the Delaware River at the point where General Washington crossed with his army the night before the Battle of Trenton. The McKonkey Ferry House, from which he directed the movement of his troops, is within the park. It has been renovated and is now a colonial museum. The Bear Tavern property is a part of the park. This is the landmark —two miles from the ferry—mentioned in Washington's orders as the point at which he divided his forces into two columns—one under Greene accompanied by Washington taking the Pennington Road, and the other under Sullivan the River Road to Trenton.

The park has been enlarged lately and now comprises over 289 acres. It lies along the river for more than a quarter of a mile. It was established and is maintained for the primary purpose of a suitable memorial. Its historic features have been preserved as much as possible but to these have been added picnic facilities. Camping is not allowed. Besides the ferry house the significant features of the park are Continental Lane, Washington Grove, Sullivan's Grove and Greene's Grove. About 25 acres have been developed into a formal park and the National Chapter of the Daughters of the American Revolution has built a Memorial Garden of colonial aspect. The park contains a State Forest Nursery in which seedlings are grown for State reforestation and adjacent to Continental Lane 100,000 evergreens have been planted over a plot of 100 acres. Sample blocks of an acre each show the different species of evergreens used for forest planting. Sometime these acres will constitute a delightful grove of upstanding trees.

Swartswood Lake Park

This park is 6 miles west of Newton in Sussex County. Most of its 567 acres are occupied by Swartswood Lake set in mountain scenery. The groves of the park are popular places for picnics, but camping is not allowed.

Washington Rock Park

This is a small State Park of about 10 acres on Watchung Mountain, Somerset County. It

was acquired by the State in 1913 and is the site of a monument commemorating the use of the spot for observation by General Washington in 1777 at the time of the Battle of Springfield. The other State Parks are in the care of the Department of Conservation and Development, but this park is supervised by a special body known as the Washington Rock Park Commission.

County Parks

County park systems may be established under a law passed in 1895 which permits any county with a population of 200,000 to undertake such a system, to issue bonds for its acquisition and development, and to add to the tax levy for its maintenance. Essex County was the pioneer, creating the Essex County Park Commission under the provisions of the act the same year it was adopted. Hudson followed in 1902, with slightly different provisions, and Union in 1921. Steps have been taken by the Counties of Camden, Bergen, and Passaic to create similar park systems in their respective counties.

The selection of park sites is peculiarly important and an effort was made to remove them as far as practicable from political control. Accordingly, the Act of 1895 provided that county park commissions be appointed by the justice of the Supreme Court presiding in the respective county courts and that they serve without compensation. An exception was made for Hudson County by Chap. 277–1902. The common pleas judge in that county makes the appointments and the commissioners receive $1500.

Since it is not restricted by municipal lines, the county can provide a well-balanced park system. It can establish reservations to preserve natural scenery. These reservations are as important as are more formal parks. They supply that retreat, away from the man-made world that all of us long for at times. Here we find nature in her happiest mood, with brooks, the songs of myriad birds, cool inviting shade, a wealth of riotous color in blossoms and foliage, and the scurrying of wild things.

Both summer and winter joys breathe the new view-point of the out-of-doors.

ONE OF THE WOODS-ROADS THROUGH THE DENSE FOREST IN SOUTH MOUNTAIN RESERVATION

Essex County Parks

Essex County's parks comprise 3915 acres of woodland and formal landscape development; 23 miles of park roads and boulevards; 23 miles of equestrian roads, and 45 miles of trails and walks. The formal parks under the control of the Commission are, Weequahic, Vailsburgh, Independence, Riverbank, West Side and Ivy Hill in Newark; Branch Brook in Newark and Belleville; Yanticaw in Nutley; Watsessing in East Orange and Bloomfield; Verona in Verona; Orange in Orange and East Orange; Grover Cleveland in Caldwell; Belleville in Belleville; Irvington in Irvington; Anderson and Glenfield in Montclair. Park Avenue and Oraton Parkway serve as connecting links in the system.

South Mountain and Eagle Rock Reservations, lying in the Watchung Mountain range, enclose 2500 acres of natural forest, into which bridle paths, trails, picnic grounds, camp sites and delightful drives have been artistically fitted. These reservations are havens of rest and the public derives rare enjoyment from driving or rambling through the wild woods, climbing hills, following brooks in shady ravines, and enjoying distant prospects.

These large woodland tracts, particularly South Mountain Reservation, have a constant popular appeal, for they hold our interest all through the seasons year after year. They can be enjoyed in winter after a light snowfall when the leafless branches of shrub and tree show their dark traceries against the whitened ground. One is delighted with their spring effects when violets, hepaticas, anemones, and all the little wild flowers spring up from the browned leaf carpet; when the pink azalea nudiflora and the wild honeysuckle are blossoming; when the dogwood is flowering and the laurel is in bloom. Visitors have rejoiced in their autumnal aspects when the cool days bring colorful patterns into the landscape with the burnished huckleberries, the mosaicked maple-leaved viburnums, the changing sassafras, the red maples, the yellowing ironwoods, and the russet oaks.

The commission desires to keep these stretches of mountain landscape as nearly as possible in their original state, that the public may thoroughly enjoy their beautiful natural scenery. With that in view it has sought to reintroduce those species of trees, shrubs, and wild flowers which formerly thrived here but which, from one cause or another, have been destroyed or are becoming extinct.

Every effort has been made to attract and protect the bird life and the forms of animal life whose habitat is in the mountain reservations. There are numerous gray squirrels, hares, foxes, and raccoons, while songbirds, pheasants, quail, and partridge are familiar sights in the timbered areas. The native red deer have disappeared and the commission would have gladly restocked the reservations with this species but for the fact that these animals are shy and rarely permit themselves to be seen, whereas the fallow deer, hundreds of which the commission has introduced in South Mountain Reservation, are gentle and least shy of all the deer species, and will quietly graze in the open fields to the delight of the visitor.

Essex County is proud of the view from both Eagle Rock and Washington Rock. The whole of the county is to be seen from the former and on clear days Jersey City, New York, Hoboken, Rutherford, Passaic, Bayonne and Elizabeth stand out to the view in surprising detail. From Eagle Rock can be seen the homes and workshops of more people than from any other natural elevation in the world.

Washington Rock overlooks the valley between the two Orange Mountains. The views are principally those of hillside, stream, and forest. Tradition tells us that this is one of the vantage points from which General Washington watched the progress of the British forces from Elizabethtown toward Morristown, before the battle of Springfield. In getting to Washington Rock one may go along the new road from South Orange Avenue that follows the crest of First Mountain for about two miles.

The two largest county formal parks lie mostly in Newark. They are Branch Brook Park and Weequahic Park. They are the resorts of lovers of flowers and formal landscape and they are Meccas for those who delight in healthful sport and other out-door exercise. These parks are among Newark's most valuable

DEER PRESERVE IN SOUTH MOUNTAIN RESERVATION

This is the delight of thousands of grown-ups, as well as kiddies, throughout the year. Hundreds of deer of all sizes and ages are usually out in the open where they can be seen

assets and visitors exult at their beautiful setting and various activities. The former is partly in Belleville but wholly within an area that is thickly populated. Fascinating lakes set among drooping willows, woodland streams with stone arched and rustic bridges, winding roads kept in perfect condition for motorists, a concert pavilion, boat-house, acres of lawn for baseball and football and scores of clay tennis courts, offer an unparalleled opportunity for both rest and recreation for the masses in whose midst this park has been placed. In one grove there is a playground restricted to the use of crippled children with games suitable for such youngsters.

On a Saturday afternoon in Weequahic Park one finds it difficult to follow all the different events. The half-mile track for trotting races is the scene of contests replete with speed, stamina and hard-fought finishes for applauding throngs that fill the grandstand. It is now equipped with a system of amplifiers through which announcements may be heard all around the track. Other contests that attract rival crowds in the same park are the model yacht and motor-boat races held Saturday afternoons. Skippers, young and old, launch craft that elicit enthusiastic cheering from the spectators lining the shore. A similar scene is enacted almost daily throughout the summer on Harrison Pond, Edgemont Park, Montclair.

Gardens abound in all the Essex County Parks. Weequahic has an extensive rose garden and a plantation of lilacs, while in Orange Park there is a collection of 4000 irises presented by the late Dr. George R. Kent. There is an annual chrysanthemum show at the Branch Brook Park Greenhouses. Courses in Weequahic and Branch Brook cater to hosts of golfers and at Watsessing Park there is a meticulously kept bowling green for the devotees with whom Essex County abounds of one of the oldest of organized sports.

Union County Parks

The Union County Parks are similar in concept and variety to those of Essex. They are 10 in number and occupy 3,600 acres. This is close to six per cent of the acreage of the entire county, but the commission foresees the needs of the not-far-off day when the county will be completely built over with homes. With this in mind it has extensions under way that will increase the acreage to 10 per cent.

In the parks of this county—younger though they are than the extensive developments of neighboring Essex—we find the same idea of location and use. The units within the populated areas are given over to play purposes, spacious greens and formal gardens that interest and instruct. For the lover of the freedom of woods and hills the 1,800 acre tract, called Watchung Reservation, stretching along the mountainside from Scotch Plains to Springfield, is kept in its natural state, except for good roads, bridle paths and forest walks. Ultimately the Rahway River Parkway, now well along toward completion, will span the county from north to south with outstretched arms to Watchung Reservation and Echo Lake Park on the west and to Galloping Hill Park on the east. It will link up with South Mountain Reservation in Essex County, now separated by a scant mile, and thereby create a continuous drive through the two county-park systems that will be much longer and will pass through far more varied landscape than that of the famous Rock Creek Park in Washington, D. C.

As in Essex, the commission has distributed the county parks quite uniformly. There is Green Brook Park on the western border of Plainfield where Somerset and Union Counties meet. At the other side of Plainfield, bordering Middlesex County, is Cedar Brook Park. A projected parkway along Green Brook will soon connect the park of that name with Watchung Reservation. Echo Lake Park rests on the borders of Westfield and Mountainside and is in the heart of the county. Nomahegan Park in Cranford is close by. To the northeast is Galloping Hill Park serving Kenilworth and Union. The city of Elizabeth has Warinanco and Elizabeth Parks. John Russell Wheeler Park is in Linden. These nine, with Rahway River Parkway, comprise the county group.

When the commission was organized in 1921, no municipality possessed adequate park or recreational facilities. Now all are well and conveniently served. Large sums have been appropriated by the county and donations of

ADMINISTRATION BUILDING—WEST HUDSON COUNTY PARK

FOUNTAIN PLAZA—WEST SIDE PARK, JERSEY CITY

BOULEVARD ENTRANCE—WEST SIDE PARK, JERSEY CITY

WOODLAND WALK—WEST HUDSON COUNTY PARK

175 acres of valuable property by public spirited citizens have helped to advance park developments.

Swamps have been reclaimed and filled, or converted into attractive lakes. A riding stable with 50 stalls has been built in Watchung Reservation, where riding instruction is given. Twenty miles of bridle paths radiate from the stable and afford convenient entrances over wooded trails without passing through the traffic of main highways.

Watchung Reservation—largest of the parks—lies in the Blue Brook Valley between First and Second Mountain. It combines some of the features of Eagle Rock and South Mountain Reservations in Essex County. The view from Peckham's Tower in the south-easterly section is superb. It seems astounding that such primal country exists within 20 miles of New York City. Wild deer and smaller game are abundant. Silver Lake is regularly stocked and affords opportunity for boating and fishing. Here is Lake Surprise, a mile in length with facilities for bathing, boating, canoeing, fishing, picnic parties, camping and skating.

Recreational provisions have been distributed throughout the parks of the county to the extent of 16 baseball fields; 11 football and soccer fields; 10 lakes for fishing, boating, bathing, skating and hockey; 12 tennis courts; 11 refectories; numerous picnic groves with fireplaces; an athletic stadium; playgrounds and wading pools for small children; and separate areas for trapshooting, lawn-bowling, cricket, fencing and handball.

With all these opportunities for rest and play, Union County parks are immensely popular. Field days and water carnivals are frequent; and the history of the county, commemorated in 1928 by a spectacular pageant in Echo Lake Park, strengthened the interest of the people.

Hudson County Parks

The Hudson County System is limited as to acreage, and accordingly goes in for intensive use of every tract.

West Side Park, in Jersey City, is the most centrally located and has a frontage on the Hudson County Boulevard. It extends westerly to the Hackensack River. This park is the eastern gate-way to the Lincoln Highway. An Archery Club of 400 members holds weekly tournaments on its fairway.

North Hudson Park at 35th Street, Woodcliff, overlooks the Hudson River and has a view up and down the river and across to Riverside Drive in New York City. Washington Park, formerly the Suckley estate, situated partly in Jersey City and partly in West Hoboken, is surrounded by built-up residential sections. Hoboken Park was formerly the site of the St. George cricket grounds. It has been developed for athletic and playground activities. Bayonne Park extends from Avenue C on the east to Newark Bay on the west and is crossed by the Boulevard. West Hudson Park is in Harrison and Kearny. There is a driveway throughout its length and open rolling lawns and wooded hills with water features and playground facilities.

The six parks are all in centres of dense population. Hence, they are used by large numbers of people. They have been placed so that they benefit all parts of the county and they abound in recreational facilities such as ball fields, swimming pools, driveways, paths, promenades, lawns and some wooded tracts. There are 60 clay tennis courts. Structures for shelter are well located. Flower gardens are numerous and beautiful. Most of the parks are on the County Boulevard, and this makes them quickly accessible to those who live at a distance.

These, and the comparatively near-by parks of the larger county systems of Essex and Union, exert a wholesome influence on an immense population, for they attract thousands from New York as well as from New Jersey, and make for the greater health and happiness of countless people.

Camden County Parks

Specialists were put to work a few years ago by Eldridge R. Johnson to find a way to convert the unsightly swamps and meadow-lands of the Cooper River basin into a parkway. They were waste lands, breeding mosquitoes, and were unfitted for any commercial purpose.

A comprehensive plan was evolved and with

this initial advantage Camden County is going forward. A county park commission was created two years ago and one park has been finished. The commission has reclaimed the upper reaches of the river and established there a general playground area; a charming lake that comes down to a low water-fall over an artificial dam of cobble-stones; picnic grounds; gardens, lawns and shrubbery; and other means of rest and recreation.

GAMES AND SPORTS

Sports of all kinds play an important part in the life of New Jersey, and it may be said fairly that this State has a real part in the realm of sport. It has a field unexcelled for yachting, motor-boat racing, tennis, and golf. These four forms of sport are mentioned first because their cohorts are actual participants. In boxing, football, and baseball, there is the thrill of large assemblies, but after all, playing the game is the big compensation.

In the first quarter of the Eighteenth Century horse racing was the only prominent sport in New Jersey, the races being run on Broad Street, in Newark, south from Market Street. Gifford's Tavern, at Broad and Market streets, was the gathering place for the horsemen, as it also was for participants in the mammoth fox hunts held about the same period, and for which hounds and hunters were brought from as far as Virginia and the Carolinas.

But horse racing for runners now is a thing of the past in New Jersey, the sport having been brought into disrepute by gamblers and for this reason abolished. In its day, however, it cut a figure, with tracks at Monmouth Park, Linden, Guttenberg, Clifton, and Gloucester holding the public's eye.

For those who like trotters the State still has something to offer. The Road Horse Association of New Jersey is an active organization and conducts a number of attractive meets each summer at the Weequahic track in Newark. Interest in the horse is kept up by the annual fairs and the horse shows, such as the Paterson Horse Show, the Morris County one at Morristown, the Far Hills exhibition, the Monmouth County Horse Show at Rumson, the Westfield Horse Show held in its armory, and by the hunts such as the Essex Fox Hounds and the Monmouth County with its meets at Marlboro, Scobeyville, Red Bank, and other places.

Although New Jersey is a farming State, there probably is more sod broken with niblicks than with plowshares. The State contains something like 75 golf courses, and their number is increasing annually. The glacial undulations of the land and its adaptability for growing grass, as well as the adaptability of the population for golf, are conditions ideal for more and more golf courses.

The Baltusrol Golf Club, where Bobbie Jones lost his amateur crown in 1926 to George Von Elm, is near Summit and Short Hills. The Morris County Golf Club at Convent has been the scene of many interesting tournaments. The Shackamaxon Club at Westfield has often been a championship battleground. Experts who have played the Hollywood links near Asbury Park declare it one of the best and most scientifically laid out courses in the country. Pine Valley is an unusual course that golfers travel across the continent to play.

New Jersey has also produced its share of brilliant linksmen, the most outstanding of whom is Jerome D. Travers, of Montclair. Travers, 15 to 20 years ago, was America's greatest amateur golfer. He won the amateur championship four times, the greatest number it has ever been won by one individual, and he led a great field in the national open championship at Baltusrol in 1925. Golfing supremacy in the State has now been left to younger players, notably William M. Reekie, of Montclair, and Lauren Upson, of Englewood. Reekie has twice held the Metropolitan title and Upson has since been State champion. Johnnie Golden and Bobbie Cruickshank are professionals who have brought New Jersey its share of renown, and there is a younger crop of golf

SPORTS ON SUNSET LAKE NEAR BRIDGETON

PALMER STADIUM AT PRINCETON UNIVERSITY

pros who are bound to be heard from in the future.

Most of New Jersey's country clubs are linked up with superb golf courses, but many provide for tennis, yachting, and other sports. A list of the well-known Jersey country clubs includes the Arcola Country Club; Asbury Park Golf and Country Club; Atlantic City Country Club at Northfield; Baltusrol Golf Club at Short Hills; Beacon Hill Golf Club at Atlantic Highlands; Braidburn Country Club at Madison; Brigantine Yacht and Golf Club; Canoe Brook Country Club at Summit; Cape May Golf Club; Colonia Country Club; Cohanzick Country Club; Country Club of Salem; Crestmont Golf Club of West Orange; Deal Golf Club; Diamond Spring Club; East Orange Golf Association; Echo Lake Country Club at Westfield; Elmwood Country Club at Warren Point in Paterson; Englewood Golf Club; Essex County Country Club of West Orange; Essex Fells Country Club; Ferncliff Country Club; Fort Ellsborg Country Club; Forest Hill Field Club, Bloomfield; Glen Ridge Country Club; Green Brook Country Club at North Caldwell; Hackensack Golf Club; Hollywood Golf Club at Deal; Homestead Golf Club; Houvenkopf Country Club, south of Suffern, N. Y.; Hydewood Golf Club; Jumping Brook Country Club near Asbury Park; Knickerbocker Country Club at Tenafly; Lake Hopatcong Country Club; Lakewood Country Club; Lackawanna Country Club; Linwood Country Club; Locust Grove Golf Club at Rahway; Madison Golf Club; Manasquan River Golf Club; Maplewood Country Club; Metuchen Country Club; Montclair Golf Club; Morris County Golf Club at Convent Station; Mountain Ridge Country Club; Musconetcong Country Club; Newark Country Club; New Brunswick Country Club; North Jersey Country Club, near Paterson; Norwood Golf Club at Long Branch; Ocean City Golf Club; Oradell Golf Links; Orange Mountain Golf Club; Pinebrook Golf Club; Phelps Manor Country Club at Teaneck; Pine Valley Golf Club; Plainfield Country Club; Point Pleasant Golf Club; Raritan Valley Country Club in Somerville; Ridgewood Country Club; Riverton Country Club; Rockaway River Country Club; Roselle Golf Club; Rumson Country Club; Seaview Golf Club; Shackamaxon Country Club at Westfield; Shrewsbury River Country Club; Somerset Hills Country Club at Bernardsville; South Orange Field Club; Spring Brook Country Club at Morristown; Springdale Golf Club at Princeton; Sussex County Golf Club, near Sussex; Spring Lake Golf and Country Club; Suburban Golf Club of Elizabeth; Summit Golf Club; Tavistock Country Club at Haddonfield; Teterboro Golf Club; Trenton Country Club; Upper Montclair Country Club; Walkill Country Club; Watchung Valley Country Club at Plainfield; Weequahic Golf Club; West End Golf Club; White Beeches Golf and Country Club at Haworth; Wildwood Golf Club; Woodbury Golf Club; and Yountakah Country Club at Nutley.

In tennis New Jersey has taken a leading part for 30 years. At present more than 50 of its clubs are affiliated with the United States Lawn Tennis Association, two of the oldest and most prominent organizations being the Seabright Lawn Tennis and Cricket and the Orange Lawn Tennis Club. The annual invitation tournament of the Seabright Club on its Rumson Road courts in late July or early August has been for years looked upon as the final "warming up" practice week for both the men's and women's national championship. The Orange Club's invitation tourney at the end of May each year has always attracted the country's leading male stars.

The Montclair Athletic Club field, with its perfect courts, is the scene of many championship meets. Here also may be seen bowling on the green more extensively than anywhere outside of old England. The numerous alleys are lighted for play at night. Such annual events as the North Jersey championship, and the contests for the North Jersey Coast, the Atlantic Coast, the Western New Jersey and the State Turf Court and Clay Court championships are hard-fought events. Princeton and Rutgers have their crack teams, and good playing is always to be seen at the Bloomfield Tennis Club, the Oritani Field Club at Hackensack, the Moorestown Field Club, the Bathing and Tennis Club at Spring Lake, Westfield Tennis Club, Engleside Tennis Club at Beach

SEA VIEW GOLF CLUB—ABSECON

MAPLEWOOD COUNTRY CLUB—MAPLEWOOD

BALTUSROL GOLF CLUB—SHORT HILLS

RUMSON COUNTRY CLUB—RUMSON

Haven, Ocean City Tennis Club, Seabright Lawn Tennis and Cricket Club, and the Orange Lawn Tennis Club.

The State's prominence in tennis dates back to 1899, when Holcombe Ward, who is still playing tennis at the Seabright Club, won the intercollegiate championship, and with Dwight F. Davis, now Secretary of War, the national doubles. Since then its popularity has increased constantly. The two Larneds lived in Summit, and in 1911 William Larned was a defender of the Davis cup. He won the championship for America for seven straight years. Dean Mathey, now of Cranford, and Harold A. Throckmorton were famous New Jersey tennis players of an earlier day, and in the last few years the sport's foremost representatives included Martha Bayard (Guild) of Short Hills, Ceres Baker (Sackett), Gerald B. Emerson, Weller B. Evans, John Van Ryn, Kenneth D. Appel, all of the Oranges; Gregory Mangin, of Newark, Le Moyne Hauser, of Montclair, and others. Junior activities have been centered for years at the East Orange Tennis Club, and aside from the Seabright affair, tournaments of more or less importance are held each year at Hoboken, Montclair, Westfield, Hackensack and Spring Lake.

Football, naturally, has been the leader among the intercollegiate sports of New Jersey, and some of the best teams in football history have come out of the State. Princeton has produced most of the great elevens, with Rutgers contributing its quota, especially during the war period.

It may be of interest to note that the first game of college football in the world was played between Princeton and Rutgers in 1869; but so different were the rules that it would not be recognized as football today. Rutgers, playing on its home grounds, defeated Princeton six goals to four. It was not until three years later that Princeton played its first game with Yale, beginning a series that has now passed the 50-year mark and is the oldest in the annals of sport.

Since those early days great teams and great players have come out of both Princeton and Rutgers. One of the best of them all was the Princeton eleven of 1925, which ran up 61 points on Harvard and Yale. The Rutgers team of 1918 was another, defeating the Newport News Naval Reserve team, composed of former college stars, by 14 to 0 in a game that attracted nation-wide attention. The Princeton elevens of 1896 and 1920 compared favorably with the best the game has produced.

On the football field the name of New Jersey has been carried afar by such men as K. L. Ames, H. A. H. Baker, Hector Cowan, John R. DeWitt, Homer Hazel, Phil King, "Doc" Hillebrand, Jake Slagle, Paul Robeson, and H. P. Tallman, to mention only a few. The name of Poe has been closely associated with football at Princeton. Five brothers in all, relatives of the famous writer, have carried the orange and black colors in the field.

Lacrosse is played by strong teams from Princeton, Rutgers, and the Montclair Athletic Club.

Rutgers and Princeton also have had their fair share of outstanding baseball, basketball, and track teams and will continue to have them. The Tigers in the last ten years have won the intercollegiate basketball championship twice and tied for first place twice. A Princeton crew in 1921 achieved one of the greatest feats of a New Jersey college when it defeated the Naval Academy's Olympic champions on Carnegie Lake. The victory of this crew, which was stroked by Heinie Leh and coached by Duncan Spaeth, startled the sporting world.

There is not much amateur wrestling outside of Princeton and Rutgers. Princeton has its hockey team and its fencing experts.

The State is particularly fortunate in having a New Jersey State Interscholastic Athletic Association that is considered the most efficient organization of its kind in the United States, and its mode of operation has been widely copied. As a result of its work, scholastic football, basketball, and baseball are developed to a high degree. Annual state-wide competitions in all these sports are run off under the direction of the association.

Under its system was developed the powerful Passaic high school basketball team that attracted nation-wide notice while coached by Ernest Blood, who is now in charge of St. Benedict's Prep basketball squad.

Certain school football games in New Jersey elicit interest hardly less acute than that developed in the college teams. At the end of the 1927 season three teams were tied for first place, Central High of Newark, Atlantic City, and Rutherford. The association decided against a play-off. In basketball Trenton High School won the Class A title at Camden after a grueling struggle against New Brunswick.

For the indoor track season important meets are staged annually by Dickinson High School, of Jersey City, Prudential Insurance Athletic Association, St. Joseph's Catholic Club of Newark, St. Benedict's Prep, and Seton Hall College. In some of these the best-known athletes of the country compete. Lloyd Hahn, America's premier middle-distance runner, achieved notable victories in two events. Other outstanding performers were Miss Catherine Donovan, of the Prudential, who established a world's record for 880 yards, and Bernie McCafferty, of Seton Hall, who broke the track record at Newark Armory for 600 yards.

Other residents of the State who have made and are making their marks in track and field events include Chet Bowman, of Eatontown, the sprinter, and Johnnie Gibson, of Bloomfield, who broke the world's record for the 440-yard hurdle race at Lincoln, Neb., in 1926. The Newark Athletic Club is recognized among the big clubs of the nation for its development of track and field athletes.

Motor-boating is increasing both as a recreation and as a sport. The first touch of spring brings to life the boat yards on the Passaic River, on Newark Bay, and along the Jersey shore. The automobile traffic on week-ends and holidays has caused many to take to motorboats for their trips to and from their summer homes at the shore. Motor-boat regattas are held on the Passaic River during the season and attract large throngs of spectators. Lake Hopatcong and other lakes have events that prove most interesting. Yachting is very popular on the New Jersey shore, the more important events being held in Barnegat Bay and on Toms River. Catboats, sneakboats and outboards have their partisans, and hydroplane racing is growing in favor. Aquaplaning is a popular diversion.

Essex and Hudson counties are hotbeds of soccer. New Jersey has produced more and greater soccer players than any other State in the Union, except Missouri. Ice-boating is popular on the Shrewsbury River and polo plays no small part in club life, notably at Rumson.

Walter Johnson's assumption of management of the Newark baseball team of the International League gave New Jersey more prominence in baseball than it had attained at any time, with the exception of Newark's entrance into the old Federal League, which was started to compete with the two major leagues. Jersey City also has a team in the International League.

There are numerous amateur and semi-professional teams in New Jersey, organized into various leagues. The State has produced many big league ball players, the late John (Dots) Miller, of Kearny, having been one of the best known. Others of present or recent prominence include Ralph (Speck) Stroud, who came from the vicinity of Dover; Leon (Goose) Goslin, of Camden; Alex Ferguson, Bloomfield; Owen Carroll, Newark; George Haas and George Earnshaw, of Montclair (now with the Philadelphia Athletics); Moe Berg, Newark; and Frank O'Rourke, Elizabeth.

New Jersey might be called the home of bicycle racing. The game was introduced into this country about 1870 when a troup of English cyclists came here to race on dirt tracks. It spread to the West, and Salt Lake City became the cycling center. The game died out there, and on the rebound hit Newark, where in its Velodrome cycling has since prospered as have few sports anywhere. In recent years the sport has attained more general popularity.

The Legislature passed a law permitting decision boxing contests in New Jersey and it has given pugilism a great impetus here. It will be recalled that it was in this State, in the famous Boyle's 30 Acres, in Jersey City, that Tex Rickard's first "Battle of the Century" was held—the battle in which the then heavyweight champion, Jack Dempsey, knocked out Georges Carpentier. It is not improbable that decision boxing will lead to other big pugilistic encounters.

MOTOR-BOATING ON THE HACKENSACK RIVER

WATER SPORTS ON LAKE HOPATCONG

There are boxing clubs in all parts of the State, and a smaller edition of Madison Square Garden is now being erected in Newark for major boxing contests, ice hockey, and other indoor sports patronized by great throngs. Atlantic City's new Municipal Stadium, seating 48,000, will be the largest indoor arena in the world.

The sporting life of New Jersey would not be complete without mention of the annual ice-boat races on the Shrewsbury. Aviation also has its growing list of enthusiastic flyers.

Polo fields are many, and some of the warmest contests take place on the Rumson Country Club polo field, the Saddle River polo field, the Crestmont Golf Club field, the Oraworth field at Oradell, and with the teams of the Whippany River, the Westfield, the Ramapo, the Newark City, the Essex Troop, the Tenakill Four of Closter, and the Suneagles of Eatontown. The game is played in the armory in East Orange, the Roseville Avenue Armory in Newark and the armory in Westfield.

There is a fine automobile racing track at Woodbridge, and another on the White Horse Pike near Hammonton.

The community life of the State has its dog shows and kennel clubs; its river pageants; its historical pageants and reviews; its dances and balls and barn dances and masquerades; its baby parades and beauty contests; its bridge tournaments; its dramatic clubs and theater guilds; its art exhibits; its garden clubs and flower shows; its concerts, glee clubs and orchestras; its lectures, junior league activities, and all the round of concerted pleasures that make community life more enjoyable in most attractive surroundings.

FISHING AND HUNTING

New Jersey ranks among the foremost states in producing sport for the hunter and angler. Incredible as it may seem, the sportsman's take of game and fish, exclusive of salt-water fishes, in this State annually reaches at least $1,000,000 in value on the basis of market prices.

Of course it has been necessary to resort to extensive artificial propagation of game and fish, bulwarked by reasonable laws and based on good principles of conservation. But the problem has been solved so that between 150,000 and 200,000 male residents more than 14 years of age take out shooting and angling licenses each year.

Game production of late years has meant an annual outlay of around $350,000. However, no appropriation is made from the general funds of the state, as the sportsman pays his own way. He does more than that, because his license fee provides also for the protection of the non-game birds that are the invaluable allies of the farmer and the delight of the aesthetic. In the game farms at Rockport and Forked River, and in the hatchery at Hackettstown, built with his own funds, he has added materially to the tangible assets of the State.

National prominence has come to New Jersey, for her achievements in the distribution of trout have received widespread commendation. In fact, the system here developed is being adopted by other states.

Up to a few years ago the general custom was to stock trout streams with fry and fingerling, but young trout have many natural enemies, and the conviction developed that the percentage of fish attaining catchable size was almost negligible. It is now the plan to hold the fish until they are large enough to furnish immediate sport. Instead of distributing several millions of fry and fingerling, New Jersey annually plants several hundreds of thousands of adult fish in the larger streams and confines stocking with the infant millions to spring runs, the small feeder brooks, and a few waters which afford exceptional cover.

Estimates place the total stream area of the State at about 2,800 miles. Roughly, 650 miles of it average between 30 and 50 feet in width, and sections of this, totaling about 300 miles, are adapted to the planting of trout. The remainder of the water area consists of lakes, mill ponds and shallow riffles, which are inhabited for the most part by bass, pickerel, perch, and other warm-water fishes.

STATE FISH HATCHERY AT HACKETTSTOWN

WHERE THE PLEASURE FISHING BOATS TIE UP AT ATLANTIC CITY

Three varieties of trout are produced at the state hatchery—Eastern brook trout, browns and rainbows. The hatchery, a model plant, embraces 120 acres and contains, in addition to hatchery and nursery building, 200 pounds, five of which cover an acre each. Recently a tract of 33 acres was acquired nearby, which will permit of the construction of one and one-half miles of rearing ponds of about an acre each. When fully developed, this latter area will enable the State to just about double its present output of large fish.

Altogether, practically 100,000,000 fishes will have been produced when 1928 closes. The culture of the bass is a comparatively new phase of the activity, but splendid headway is being made with it.

While, generally speaking, rainbow trout predominate in the streams, the proportion of brooks and browns caught by the angler is large. The more northern counties furnish the better trout streams, for the water is cooler and less sluggish there than in the central and southern sections. Warren, Sussex, Morris, and Hunterdon are the best fishing grounds. Among the larger and more popular waters are the Musconetcong Creek, the Pequest, the Paulinskill, the South Branch of the Raritan, and Flatbrook. In their riffs and pools a host of anglers find excellent sport throughout the season.

Wading River, which flows through the Burlington wilderness, to the vicinity of Tuckerton, may be followed with much success. It is a short stream, but one of many twists and turns. The canoeist may follow it for long reaches without coming upon evidence of habitation except the huts of cranberry pickers, which are occupied only a short time after the first few frosts of autumn. Numerous deer come down to drink from the river, which is filled with stumps and brush, the haunts of pike.

Of lakes and ponds there are a multitude, ranging downward in size from Hopatcong and Greenwood. While those north of the Raritan are much better known than those farther south, anglers familiar with both contend the latter have a bit the edge on the former when it comes to productiveness. Naturally, they are not fished so much as those nearer the centers of population.

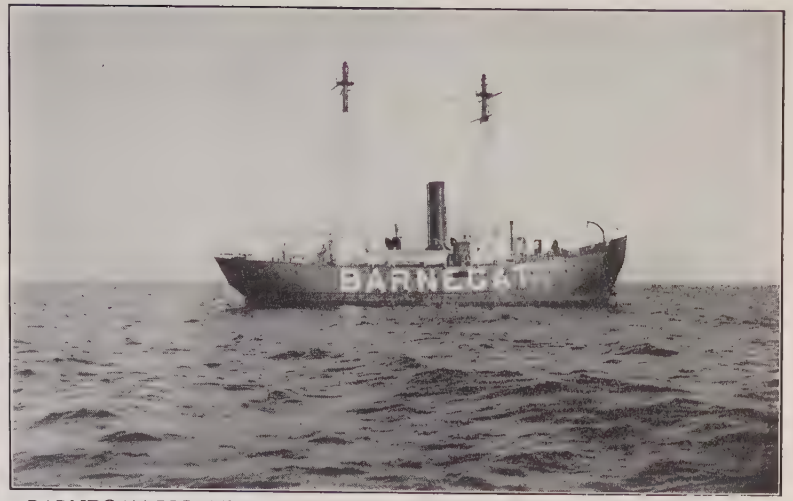
Bass, pickerel, and perch are found in the lakes and the ponds. The small-mouth is more eagerly sought than his clumsier cousin, the large-mouth or Oswego, but the latter is no mean battler and makes a fine dish for the table.

For the salt-water angler there is sport unlimited, offshore, in the surf and in the bays and inlets that dot the long coastline. Striped bass, red drum or channel bass, bluefish, and weakfish are the principal species sought. Great schools of tuna course offshore in season and angling for them is growing in popularity each year.

The capital investment in salt-water sport fishing runs into the millions. The most important single item of it is represented by the great fleet of professional boats that take the anglers to their favorite grounds. Because no license is required to fish in tidal waters it is impossible to check up on the number of anglers with any degree of accuracy, but there is no doubt it largely exceeds the number who indulge in fresh-water fishing. The range of the former extends from the extreme northern end of the coast around Cape May and up into the Delaware.

For those who prefer hunting to fishing there is the opportunity. The game ranges from the lowly cotton-tail to the lordly deer. For the lover of the bird dog, there is the sportsman's old migrator, the woodcock, and always in the more remote sections the much-beloved ruffed grouse, or mountain-bird, may be found. In all but a few counties, those more densely populated and built up, ring-neck pheasants provide thousands of hunters with sport.

The northern counties afford good deer hunting, but those who haunt the runways at the break of day favor south Jersey, especially Burlington, Ocean, and Atlantic Counties, where the deer herds are estimated to be in excess of 8,000. In a recent December only a few less than 1,800 bucks fell legal prey to hunters. This number is small when compared with the 13,000 bagged each year in Pennsylvania, or the 6,000 in Maine, or the 5,000 in the Adirondack region of New York State, but it com-



BARNEGAT LIGHTSHIP—SUCCESSOR TO THE FAMOUS LIGHTHOUSE

ATLANTIC COUNTY GAME PRESERVE HEADQUARTERS AT MAYS LANDING

HUNTERS' LODGE—THERE ARE MANY IN THE DEER WOODS

FISHING PARTIES ARE A POPULAR PASTIME AT FORTESQUE

pares favorably with the annual kill in both Vermont and New Hampshire, and it exceeds the number taken by hunters in many other larger states, including Connecticut and Massachusetts. In Burlington, Ocean, and Atlantic Counties alone, more deer fall prey to the fire of licensed hunters than are killed in all the State of Colorado with its wide open spaces and splendid game covers, or in all the 100 counties which make the rugged State of Virginia.

Settlers followed the Indians and established the city of Burlington, in Burlington County, long before the greater part of the state had been thoroughly explored, because it was in the heart of the deer country and there would always be venison. Today the hunter gets off at places with the intriguing names of Buckshooten, Turkey Swamp, Hominy Mills, Devil's Half Acre, Yellow Meeting Place, Red Lion, Double Trouble, Sooy Place, Mount Misery, Barrens, Friendship and Tabernacle, and hikes a few miles into the pine forests, swamps, and barrens for deer.

The Pine barrens, where many of New Jersey's deer congregate, form one of the most primitive regions remaining on the Atlantic Coast, though within 50 miles of New York and less than that of Philadelphia. The cutting of valuable white cedar and replacement by cranberry bogs have opened up some parts, but hundreds of square miles exist where there is nothing but white sand on which grow the stunted pines, scrub oak, and holly trees. The "Plains" proper might be narrowed to 20,000 acres in the center of the pine belt. It is a desolate region, romantic and alluring, and until it has been seen, New Jersey is not as well known as it should be.

Barnegat Bay is a favorite ground for duck hunters. With its wide marsh wastes and innumerable inlets, it is one of the most famous duck-shooting regions in the country. The backwaters of the Shrewsbury and of the Delaware also abound in waterfowl.

The situation of the game was just as bad as that of the fish not so long ago. Industrial and agricultural development, combined with the automobile and progress in the manufacture and use of firearms, was playing havoc with our furred and feathered friends. The Bob White was disappearing in north Jersey; the ruffed grouse, our only other important native upland game bird, was hard-pressed in its wooded haunts; the deer were virtually gone. Even that prolific little fellow, the cotton-tail rabbit, was finding it a job to hold his own.

For relief the authorities turned to the imported ring-neck pheasant, which had saved the day elsewhere. The State established a fine game farm at Forked River, in Ocean County, and proceeded to raise its own birds. A few years ago a second farm was acquired at Rockport, near Hackettstown, in Warren County. In the five years beginning in 1918, 23,423 of the birds were distributed; in the succeeding five years 56,920 were liberated. In addition to raising as many as possible at the farms, the State buys birds wherever and whenever it can procure them, here and abroad.

Thousands of rabbits are annually bought outside the State to augment the native supply, and recently there has been stocking with Hungarian partridges. In the meantime an effort is being made to rehabilitate the quail in the northern counties by a long closed season and by bringing in birds from outside to increase the brood supply. The grouse, too, are protected the year round in certain counties and the daily bag limit in open sections is low.

The restoration of the deer is one of the most remarkable incidents in the history of game affairs and furnishes an excellent illustration of the value of conservation principles properly applied. The supply was practically exhausted when, some 30 years ago, a law was passed closing the season on them indefinitely. A few animals were brought into the State and turned loose. Before many years they multiplied to such an extent that it was possible to allow a short season for shooting, bucks alone being legal quarry. An open season averaging four days with certain limitations on hunters has prevailed ever since, and year after year the total kill has increased without noticeable diminution in the supply remaining. In the four open days of 1927, 1,790 bucks were legally bagged in the state, 69 of them in Bergen County, almost within sound of the whistles of New York's factories.

MOTORING; ENJOYABLE TRIPS

New Jersey has many points of historic interest and many highways to delight the motorist. Modern hard-surfaced pavements are kept in excellent condition. Every modern safety and directional appliance has been provided for the guidance of motorists and unacquainted tourists.

Several trips of interest are here described, the mileage being covered to serve as a basis for calculating the time necessary for each journey.

Trip 1.—From any point in northern New Jersey, drive to Suffern, N. Y., or, if desired, pick up this route by driving to Riverdale over the Pompton Turnpike. From Suffern, turn west under the Erie Railroad on the Ramapo Valley Road. Note that for long stretches the trees alternate from pine to maple. Continue through Darlington, where is found the Immaculate Conception Seminary. On the right is Glen Gray, the camp of the Montclair Boy Scouts, and up the road over the river is Delbrook Farm, a wooded paradise popular as a camping spot on top of the mountains. Continue on the Ramapo Valley Road to Oakland, passing on Pompton Lake the "Sunnybank" home of Albert Payson Terhune, writer and traveler. Next on the right is Scenic Falls and the town of Pompton Lakes. Turn left on Wanaque Avenue and right on Hamburg Turnpike to Riverdale—13.0 miles. The famous Wanaque Reservoir, to supply Newark, six miles long, one mile wide, with a concrete dam 1500 feet long and 100 feet high, has just been built in this locality.

Continue straight ahead on Route No. 8 and up the Pequannock Gorge to Bloomingdale, Newfoundland, Beaver Lake (which is privately owned), Franklin, Hamburg, and Sussex, then right and on to Quarryville and Unionville—38 miles.

This stretch is one of the most picturesque and enchanting in the State, with mountains on every side and wonderful scenery. At the

JENNIE JUMP MOUNTAIN NEAR HOPE

THE GREAT STATE HIGHWAY FROM HACKETTSTOWN TO WASHINGTON FOLLOWS THE MUSCONETCONG RIVER THROUGH THE BEAUTIFUL VALLEY OF THAT NAME

northern end of Sussex County is High Point Park, owned by the state; 10,000 acres being maintained for the use of the public. High Point is the most elevated land in the state. Here a monument, 225 feet high, is being built as a memorial to all the soldiers and sailors of American wars. The two highest lakes in the state, Lake Rutherford and Lake Marcia, are also in this park. At Sussex is the Clove Valley with its old Indian fort, 212 years old, and Clove Church, 200 years old.

At Hamburg, to the right, is the Vernon Valley road, with historic and interesting features. It is one of the richest valleys in the East, lying between the Pochung and Hamburg mountains. At Franklin are famous zinc mines, which extend 2,000 feet underground and have 75 miles of electric railway. This region is scenically beautiful and on a trip of 150 miles from Newark it is possible to pass by 25 lakes.

Trip 2.—Starting from Elizabeth, turn west on Westfield Avenue or State Route No. 9 and follow to Roselle Park, Westfield, and Plainfield, passing in Garwood the large plant of the Aeolian Company. Plainfield contains many attractive homes and several industrial plants. Continue over Route No. 9 to Dunellen, with the Watchung Range to the right, on the summit of which, above Dunellen, is Washington Rock Park, the lookout promontory of General Washington during the Revolution. Continuing on Route No. 9, the next town is Lincoln, then Bound Brook, which in early days was on the boundary line between East and West Jersey. Bound Brook has large industries, such as the Calco Chemical Works and the Johns-Manville Asbestos plant. Following over the same route, Somerville is reached—24 miles from Elizabeth.

General Washington spent the winter of 1778–1779 at the Wallace house in Somerville. Visitors are permitted to go through the rooms and look at the interesting relics. Turn right on Mountain Avenue to Pluckemin, 28 miles, where can be seen one of the original milestones that were used in early days, and where one may see the first altar cloth used in the Reformed Church in America.

Turn right in the center of the town on a macadam road, and enjoy a ride through the beautiful Washington Valley of rich farms, fine orchards, wild flowers, and pleasing scenery to Martinsville, 34 miles. Then on to Warrenville, 38 miles, where is located the magnificent Hopfheimer estate.

Turn right on Mountain Boulevard to Watchung, 40 miles, enjoying the rustic setting of this quaint hamlet, bear right on Watchung Avenue to North Plainfield, 41 miles, then turn left on Mountain Avenue and follow past Mount St. Mary's, perched high on the mountainside, to Scotch Plains and Springfield, 50 miles. Here turn right on Morris Avenue through Union to Elizabeth, 57 miles.

Trip 3.—Taking Morristown as the point of departure, drive north on Speedwell Avenue at Washington Park, and follow to Morris Plains, where on the left is Greystone Park, the state home for the feeble-minded. Continue to Mount Tabor, a summer cottage colony, to Denville, 6 miles, all on Route No. 5. Turn left to Rockaway and Dover, 10 miles; the latter formerly the seat of the iron industry and a busy industrial center at present. Continue on to Ledgewood, 15 miles, and Netcong, 17 miles, just north of which is Lake Hopatcong, the largest body of water in the State and a noted summer resort.

Following Route No. 5, pass along Budd Lake, with its bungalow colony, and on over the Musconetcong mountains until one glides gracefully down into the valley and crosses the river into Hackettstown, where the State fish hatcheries are located—24 miles. Following straight through the town, climb over the mountain ranges where the scenery ever increases in grandeur through the far-sweeping Pequest Valley, to Buttsville, 36 miles. Continuing on Route No. 5, one may reach the Delaware Water Gap, a distance of 54 miles from the starting point, or turn right to Blairstown and continue on to the Gap over an equally fine concrete road "up hill and down dale."

Trip 4.—Starting from New Brunswick, cross the town on George Street and turn right on Commercial Avenue and out Route No. 1 to Dayton, Hightstown, with its boys' academy, on to Hamilton Square and Mercerville to Trenton. This was the line of General Washington's march to the battle of Princeton. Trenton is 33 miles from New Brunswick. Turn left on Chambers Street in Trenton to South Trenton. Continue into White Horse and over Route No. 2 to Bordentown, passing on the right Point Breeze, Joseph Bonaparte's old estate, and the Bordentown Military Institute. Continue through the town on Route No. 2 to Fieldsboro, the home of a large brick industry and the State Industrial School; on to Burlington, where the first newspaper in the State was published and the first free public library was established.

Continue over Route No. 2, south of Burlington, and follow to Beverly, and Riverside with its large watch company plant, and to Bridgeboro on Rancocas Creek, over which a new bridge has been built, and from which the last covered bridge on a State road was removed. Follow over Route No. 2 to Five Points, and Pensauken into Camden—36.2 miles from Trenton. This is the city of great shipyards, great industries, and the terminal of the Delaware River Suspension Bridge. It has a large outlying suburban residential district.

Trip 5.—If one wishes to note contrasts between the old and the new, a trip from Egg Harbor to Cape May City furnishes many. Turn south from Egg Harbor over Route No. 14 to Mays Landing, county seat of Atlantic County. Drive on to Esterville and Oakville, passing the ten-mile long shell-loading plant on the left, now out of use, and to Corbin City, Tuckahoe, Ocean View, Cape May Court House, with its 200-year-old court house, then to Whitesboro, with an entire colored population, Rio Grande, Bennet, and Cold Spring, with its large dirigible shed and hangar, which is a naval base for the United States Navy. Cross Schellinger's Landing into Cape May City, a clean residential town with large hotels and a fine bathing beach, the home chiefly of retired sea captains. Continue straight ahead over Sunset Boulevard to Cape May Point, with its lighthouse, life-saving station, cottages, and little activity. Cape May City is 50 miles from Egg Harbor.

VENTNOR—THE CHARMING SUBURB OF ATLANTIC CITY
A community of all-year homes on the ocean front

Trip 6.—Leave Atlantic City over Absecon Boulevard to Absecon, 7 miles, where the first successful life-saving test was made in 1847. It resulted in the establishment of the United States Life Saving Service. Turn right over Route No. 4 and over the shore road to the Sea View Golf Club, the State's finest, and on to Oceanville, 11 miles. Cross Mullica River to New Gretna, 21 miles, and Tuckerton, 28 miles, with its gigantic Marconi Wireless Station that was seized from the Germans during the War; continue on to Parkertown and Manshawken, 35 miles. A road to the right leads to Beach Haven, Ship Bottom, and the famed Barnegat Light at Barnegat City, now replaced by a lightship 12 miles at sea.

A visit to old Barnegat Light will show that this lighthouse is a cylindrical tower 168 feet high, with a foundation extending 60 feet into the ground. It was built in 1856, and the light had never been out, except for a short period during the Civil War, until it was replaced by the lightship. It was a kerosene flash of 168,000 candlepower, and usually could be seen 20 miles out to sea. In very clear weather the light was visible 40 miles.

The walls are nine feet thick at the bottom and three feet at the top. There are 300 steps to climb. The top housed a set of prisms in the shape of a bell, 12 feet high and 10 feet wide. A passageway around the top affords excellent views. This whole section is known the world over as a fishing ground and hunting area. Barnegat Bay is 50 miles long and 10 miles wide in its narrow places. From Manshawken go on to Toms River, 55 miles.

Continue over Route No. 4 to Lakewood, Point Pleasant, Asbury Park, Long Branch, Keyport, Perth Amboy, and Rahway—116.5 miles from Absecon. This is an enjoyable ride up the famous Jersey ocean shore line and over excellent pavements its entire length.

Trip 7.—From Newark, go south over Frelinghuysen Avenue to Elizabeth, 5 miles. Turn right on Westfield Avenue one block, then right on Morris Avenue and follow to Union and Springfield, 12 miles; the latter famous as a Revolutionary skirmish ground. Turn left on Mountain Avenue to Mountainside and Scotch Plains, 17 miles, and on to North Plainfield, 20 miles. Here turn left one short block, then right on Green Brook Road over an inside well-paved road along Green Brook stream to Pound Brook, 28 miles.

At the end of town, turn right on Chimney Rock Road and through a gorge in the Watchung Mountains that is unsurpassed for the beauty of its setting, 30 miles. One crosses and recrosses the brook on quaint bridges six times, noting the immense quarries with every grade of stone from screenings to cobble stones, large crushers, and the high, scarred mountainside where the rock has been blasted away. There are waterfalls to the right and left, and fishing and swimming holes all bowered over with heavy foliage. Emerging into Washington Valley one is surrounded with orchards of all kinds and fields covered with wild flowers of every color.

Continue into Martinsville, 32 miles, and turn right to Warrenville and Watchung, 38 miles. Turn left on Stirling Road, passing through pleasant towns to Brantwood and the Spring Valley service station, 54 miles. Turn right on South Orange Avenue over the Orange Mountains, and left on Wyoming Avenue to West Orange, 60 miles. Here turn right, down the mountain to Valley Road, next left, then right on Park Avenue through East Orange to Newark—67 miles.

Trip 8.—From Rahway turn south over Route No. 4 to Woodbridge and Perth Amboy, 5 miles. Cross the four-million-dollar Victory Bridge to South Amboy and Keyport, 13 miles. Continue over Route No. 4 to Centerville and Cherry Tree Corner, 17 miles. Here turn left on good concrete pavement to New Monmouth, and Atlantic Highlands, 23 miles. Drive left on Main Street and right on Ocean Boulevard or Sky Line Drive, which skirts the very edge of the Highlands 300 feet above the water, with a view of famous Sandy Hook, with Long Island in the distance.

Follow over this splendid drive to Highland Beach, 26 miles; cross the Shrewsbury River and turn right for an ocean-shore drive to Asbury Park. In Asbury Park turn right on Corlies Avenue or Route No. 7, and follow to Hamilton and Freehold, where the battle of Monmouth was fought and many interesting relics of the

Revolutionary War are to be seen. Freehold is 63 miles. Turn right at the Court House here and follow over a good road to Marlboro, and Matawan—74 miles. Turn left to Browntown, then right on a narrow gravel road to Rose's Corner, 82 miles. Turn right to Route No. 4, South Amboy, and continue left over the bridge to Perth Amboy and Rahway—86 miles.

Trip 9.—From Jersey City follow north over Hudson County Boulevard to Union City and Hudson Heights, 6 miles. Bear left on Dallytown Road to Fairview and right on Grand Avenue to Ridgefield and Leonia, 9 miles. Continue through Englewood, Tenafly, Cresskill, over Piermont Road to Closter and Norwood, and through Rockleigh to Tappan, 22 miles. In Tappan may be seen the original prison in which Major André was kept before his execution on the hill nearby.

Bear right along the brook and turn right on New York Highway to New Jersey Route No. 18 north, following along the outermost edge of the Palisades, which commands a wonderful view of the Hudson River. The road is 500 feet above the water edge in places, and it is a perpendicular drop to the river. Follow along to Alpine, 27 miles, and turn sharply on the left for a ride on the celebrated Henry Hudson Drive, winding and dipping along the river on a narrow, tree-covered roadway with sights of interest all along the way.

At Englewood Ferry, 32 miles, turn right and climb to Mountain Top, turn left on Hudson Terrace Boulevard for another distance along the top of the Palisades, and into Fort Lee, where can be seen the activity connected with the building of the new Hudson River Bridge—35 miles. Continue along Palisades Road to Cliffside and over Hudson Boulevard to Weehawken via Palisade Avenue from Union City—48 miles.

Trip 10.—From Trenton, turn west along the Delaware River on River Road to Scudder's Falls and Washington's Crossing, eight miles. Here a State Park commemorates the place at which Washington crossed the Delaware River. The McConkey House, at which he stopped, and other reminders of that event are also found here.

Continue along the river to Titusville, nine miles. Pass the Mercer County Work Farm and into Lambertville, with its immense mills, 15 miles. Turn right in Lambertville and follow the county road to Ringoes, 21 miles. Turn right on the new concrete road to Flemington, county seat of Hunterdon County, 27 miles. Follow through town, bear right along Raritan River to Dort Mills and on to Pleasant Run and Whitehouse, 37 miles. Here turn right on State Route No. 9 to North Branch and Somerville, county seat of Somerset County, with its lovely white marble court house, 45 miles.

Turn right on Bridge Street over Route No. 16, cross the Raritan River, pass the gorgeous Duke estate on the right, and through a fine, rolling country to Belle Mead, 53 miles, on to Princeton with its famous university and historic battleground, commemorated by one of the most pretentious monuments in the world, 61 miles. At the monument turn right on Route No. 16 to Lawrenceville, with its celebrated preparatory school, and to Trenton—71 miles.

UPLANDS AND LAKES

The nature lover does not have to search long and far in New Jersey for something to interest him. He finds it wherever he may be, on bleak moors, or sand dunes; on cool mountain tops, or in sunny valleys; by wind-rippled lakes and swift-moving streams, or on colorful plains and lovely uplands.

There are those who like to know the moods of nature. There are hikers who prefer the unfrequented paths. There are people whose hobby it is to fish and hunt. For these and for all those who have any interest in the outdoors, New Jersey is a treasure-land and an incitement.

This State is not the unspoiled wilderness of the day when the Indians of the Lenni-Lenape nation, roaming alone in its 4,500,000 forested, water-indented and ribboned acres, were the sole guardians of its many varieties of big game and of the many species of fish; nor of the later day when early Dutch settlers, coming up the

GREENWOOD LAKE

Second largest lake in New Jersey and one of the most popular summer resorts of the state

Raritan River, and the Quakers, exploring along the Delaware, saw herds of elk feeding contentedly along the banks. But in spite of the smokestacks of its many industries, its large cities and a great population, it still has open spaces, lakes, and uplands.

If the pounding New Jersey coast, with its fantastic sand dunes not unlike those of Cape Cod, does not appeal, the hills and the lake section of northern New Jersey may satisfy.

Perhaps one has a fond memory of Maine and New Hampshire, where the mountains are high, their sides clothed with the dark green growth of pines. In Sussex, Morris, Warren, and Bergen counties, one comes upon much of this same scenery. The hills may not be so high, but they are there, steep and rugged; and there too are the eternal pines and the sap-bearing maples still untouched by the axe. The lakes are numerous and just as beautiful, only a few miles separating such expanses of water as Budd's Lake, Lake Hopatcong, Green Pond, Culver Lake, Swartswood, Greenwood Lake and others.

The Kittatinny Valley in Sussex and Warren counties is not unlike the much more advertised Berkshires; and the Kittatinny Range, that solemn, glorified boundary guardian, may be compared with the ranges of Massachusetts and Vermont. Eye-filling vistas are everywhere, whether one visits the Stokes State Forest, High Point Park, the highest spot in the State, or the magnificent Delaware Water Gap. Throughout the northern tier there is beauty aplenty, because the hand of civilization and progress, difficult to stay, is only faintly evident. Many go only to see, but remain to love and enjoy.

Where within the easy reach of a few hours' drive from the city can an automobile party go and get the most for their time and money of exactly what they need and want? Surely it is in the open country with its green fields, running streams and bright lakes that wind and nestle among the hills and mountain heights.

In no direction from the great metropolis can one within so short a distance break free from the teeming life of multitudinous humanity as he can by simply taking a run into Sussex County, where, as in Old England, the well-fed cows and oxen while away the dreamy hours chewing their cuds in absolute contentment.

Sussex boasts 40 lakes. The beautiful Lake Hopatcong lies largely in this county. It is the land of opportunity for boating, bathing, hunting, fishing, and all outdoor sports.

"Hopatcong" is Indian for "Honey Waters of Many Coves." With its indented and irregular outline it has a shore line of over 40 miles. Although but nine miles long and from one to two miles wide, it has as much shore front as a round lake 30 times as large—that is to say, a lake having 128 square miles of surface. At an elevation of 908 feet above the sea level, it is the highest navigable lake within 350 miles of New York City. It is the largest in New Jersey; Greenwood Lake is next. The principal seacoast resorts are the only spots that surpass them in popularity with summer visitors.

Hiking also has its joys, as well as has motoring. The details of the uplands and the lakes may be seen at their best by those who leave the car-infested highways and seek them out on foot. There is no mountain in New Jersey taller than 2000 feet, but the high ridges of the State are not without interest. A climb up Kakeout Mountain near Butler will be rewarded by the wide pastoral panorama it commands on a clear day. From Wyanokie, high point near Midvale, one can get a wonderful view of the huge Wanaque dam and its mountains, valleys, and lakes for miles and miles.

One old-established New Jersey club—the Paterson Rambling Club—conducts a different hike every Sunday in the year, rain or shine, hail or snow. Few of the trips are accessible to the automobile, yet never more than a few miles from the nearest railway station or bus route. Other active New Jersey walking clubs are the Yosians, Newark branch, and the Union City Ramblers.

It is a tribute to her rugged countryside that the New York City clubs conduct most of their explorations across the Hudson in incomparable New Jersey.

Not all of the lakes are in the hill country. Over the southern sandy farm country the landscape is dotted with them. Here around the larger towns, parks enhance their natural set-

ON THE ROAD FROM MACOPIN TO BUTLER IN PASSAIC COUNTY

From Pompton to Franklin and Sussex the wide, concrete state highway climbs mountains and traverses dales that are a surprise and a delight to motorists

ting, and hidden back in the woodlands are sheets of water that are the rendezvous of hunters and fishermen. Secluded camps of city folks are along their shores.

PUBLIC PRESS

Newspapers did not make their mark in New Jersey in the beginning as in many of the old states. Situated as she was midway between the two most powerful presses in the country, at New York and at Philadelphia, the people of New Jersey were in excellent position to enjoy the news facilities of those two cities. In such excellent position were they, in fact, that for many years journalism made slow progress in the strip of land between the Hudson and the Delaware rivers.

The first newspaper in New Jersey was born of the American Revolution, in response to a desire of patriots for "news." During the war the New York and Philadelphia newspapers, censored, suppressed, and frequently forced by the enemy to shut up shop, were unable to "cover" New Jersey. The State therefore found itself compelled to print its own news or go without. New Jersey newspapermen rose to the occasion. After the excitement was over the journals of New York and Philadelphia were once more found in the taverns of New Jersey.

During the World War the newspapers of New York and Philadelphia were again unable to "cover" New Jersey. Flooded with general news, world news, and war news, local New Jersey items became a negligible quantity. This time New Jersey newspapermen rose to the occasion with permanent gain. And the press of the State emerged self-confident, self-supporting and practically self-sufficient.

During the last decade newspapers have made their mark in New Jersey. The development of an aggressive, progressive press has eliminated the metropolitan competition problem. In liberality of news gathering, fearless editorial criticism, and typographic excellence, the journals of this State are the equals of any publications in the country.

While it has become increasingly difficult for New York and Philadelphia to cover New Jersey accurately and intelligently, it has become increasingly easy for New Jersey to cover New York and Philadelphia, as well as world affairs, accurately and intelligently. This ability to give their readers general and world news in a highly satisfactory manner, plus local news, has made possible the complete domination of New Jersey newspapers in the home field.

The official circulation reports of the Audit Bureau of Circulations tell a remarkable story of progress, all the more remarkable because editors in the state have not thought enough about it to claim it as an achievement, but have simply gone quietly ahead for further gains. Circulations of New Jersey newspapers in every section of the State show a steady and substantial gain since 1918, while circulations of the metropolitan newspapers in the same New Jersey areas and over the same period of time show only negligible increases, and in many instances decreases in circulations.

Comparative circulation trends between the metropolitan sheets and the local newspapers are clearly illustrated in Newark, across the Hudson River from New York; in Camden, across the Delaware from Philadelphia, and in Trenton, midway between and crossed by both New York and Philadelphia newspaper rims. In these representative areas the problem of "foreign" competition has ceased to be a problem.

Metropolitan dailies may enter the state, and do, but they cannot compete in areas where the home town paper holds sway. And where there is a good home town paper, it does hold sway. Geographic circumstance has made New Jersey the homeland of thousands of men and women who work in New York and Philadelphia. But the hold of the metropolitan newspaper on the commuter is no greater than the hold of the metropolis itself upon him.

National advertisers have found it increasingly profitable to capitalize the good will which the home town paper enjoys with New Jersey residents. The local paper offers what

JOURNAL SQUARE IN JERSEY CITY

The handsome, broad, high bridge over the Pennsylvania Railroad is a link in the Hudson Boulevard that extends the entire length of Hudson County

advertising agents define as "advertising insurance." New Jersey people want New Jersey newspapers, and it is this desire that New Jersey publishers have been quick to capitalize.

During the past year more than 500 investigations were completed by New Jersey publications in the interests of national advertising. Big merchandising campaigns cannot be put over today in New Jersey through the mediums of New York and Philadelphia papers, because local dealers are not interested in New York and Philadelphia papers. The advertiser of necessity must make his local dealer contact through the local press.

As with the dailies, so with the weeklies. New Jersey weeklies are big papers in small towns and rank among the leading weeklies in the country. Essential factors in the life of their communities, they print the local news, direct public opinion, and mirror neighborhood life and living in their editorial pages. They give their readers something they can get in no other paper, so that regardless of how many other papers they may buy, they buy the local newspaper for that "something."

As New Jersey became metropolitanized, industrialized, and prosperous, newspapermen made the most of their opportunities. Their policy may be defined as one of progressive conservatism. Circulation problems involve quality as well as quantity. News reports are complete, accurate, clean. Essentially home newspapers, they do not give extended space to crime and scandal, assuming that the local residents will naturally exclude that kind of a newspaper from their homes.

The New Jersey Press Association, one of the most enterprising and active in the country, includes almost every newspaper in the State. Founded in 1857, it has rendered an important service in the development of the press in New Jersey, by fostering an esprit de corps among editors and publishers, and by zealously protecting the interests of the newspaper profession through its committees on libel, legislation, and advertising. From the beginning its meetings were largely attended.

In the early days it was no uncommon sight to see 50 or 75 editors, in response to notice, suddenly appear and fill the State legislative halls, each looking after his own local representative, exerting influence for what they deemed to be "the protection of the rights and interests of the people of the State." According to John Nancock, one of the early secretaries of the Press Association, "many an intractable legislator disappeared out of sight and never again was seen in public office at Trenton." The vigilance and cooperation of the committees is no less lively today. The Press Association has in a real sense lived up to its constitution: "To promote the mutual friendship of its members and the best interests of the profession."

Newspaper statistics for 1927 record 324 newspapers in New Jersey, 42 dailies and 282 weeklies, of which 205 are members of the Press Association. In 1922 the association proposed a summer conference to be held under its auspices for the advancement of the best interests of newspapers and newspapermen in the State, by a friendly interchange of opinion among themselves and prominent journalists of other states.

These meetings were the genesis of the New Jersey "Newspaper Institute," which has become a permanent feature of the program of activities carried on by the Press Association. An annual competitive exhibition of the journals of the State under the institute auspices has been a factor of considerable consequence in the production of first-class newspapers. Awards are discussed at length, not from an academic or theoretical viewpoint, but from the basis of practical experience and for practical purposes.

Professor Bristow Adams, of Cornell University, after serving for five years as judge in the institute competitions, noted "an even excellence of newspapers throughout the state, both as regarded dailies and rural weeklies, a high professional consciousness, and a keen sense of community responsibility."

The establishment of the Department of Journalism at Rutgers University was perhaps the most important contribution of the Press Association to journalistic advancement. Until a few years ago there was no instruction in the state in professional journalism. In 1924 members of the association decided that there ought

ENGLEWOOD HAS MANY WELL-KEPT, STATELY HOMES

ENGLEWOOD HAS A WEALTH OF SUCH SETTINGS AS THESE

ATOP THE PALISADES ENGLEWOOD IS HANDY FOR COMMUTERS

ENGLEWOOD IS ONE OF BERGEN COUNTY'S MOST BEAUTIFUL PLACES

to be such instruction. They came to an agreement with the Rutgers authorities, discussed the project with members of the Pulitzer School of Journalism at Columbia University and others, and then requested the State Legislature to make an appropriation for instruction in newspaper-making in New Jersey.

The result of their efforts was a $2,000 appropriation, with which a beginning was made. The new chair of journalism was organized by Professor Allan Sinclair Will, associate professor in the Pulitzer School, who was appointed first director of the new department at Rutgers.

So successful was the venture, both from the point of view of editors in the state and the State itself, that the following year the fund was increased to $8,000, and in 1927 to $11,000. The status of instruction was raised then from an elective for juniors and seniors to that of a regular department of the university, with a full four-year course.

The department was founded on three dominant principles—employment of instructors who had had not less than five years' versatile experience on newspapers of high standing, placement of students after graduation, and direct cooperation with the organized newspaper profession in the state.

The Press Association maintains a committee on relations which gives its whole-hearted and effective co-operation in the conduct of the department and everything relating to it. The Rutgers Department of Journalism is the only newspaperman's school in the country conducted under the direct auspices and with the active co-operation of newspapermen. At the end of each academic year a written report is drafted by the director for confidential circulation among members of the Press Association, containing what may be called a newspaper diagnosis of the graduates. In the wake of these reports students are graduated directly into the newspaper mill.

Editors in the state want the college-bred man; they want the investigating quality of mind, the tenacity of memory, and the broad-mindedness which are the marks of the college-bred man. They are anxious to employ correspondents and reporters who can render the intelligent service that their readers demand, and they believe that the college man has much in his favor for rendering this service.

Many factors of importance have contributed to the building up of a powerful and prosperous press in the state. Coordination of interests and the assimilation of lesser journals by leading papers in various areas during recent years have resulted in broader news coverage and higher standards of service. A great many modern newspaper plants have been built, with every convenience for the collection and dissemination of news. Others have been re-equipped with modern printing and circulation devices. In response to demand by publishers and the public for "all the news," the New Jersey bureau of the Associated Press has expanded rapidly, all the leading papers using full A. P. service.

New Jersey newspaper success is the kind of success not easily assailable. The courage, integrity, and quality-mindedness of newspapermen in the state have built up the prestige of their journals and the confidence of their readers. In the last analysis progress has been the result simply of making good newspapers. The success of New Jersey newspapers has been founded entirely upon their merit as sources of news, and because of this fact they have succeeded in overcoming New York and Philadelphia competition.

ON THE TREE-CLAD HILLS OF BERGEN COUNTY

RIDGEWOOD IS ANOTHER LOVELY, RESIDENTIAL TOWN

SHADED STREETS, ATTRACTIVE HOMES, RECREATIONAL BENEFITS

MAKE IT A THRIVING SUBURBAN COMMUNITY

THEATERS

The motion picture industry, which is today one of the largest in America, was cradled in New Jersey. If one looks back 30 years, he will realize that it was this State which gave the cinema an impetus that has carried the industry to its present place. Mechanically, inventively, and productively, New Jersey has contributed much to the making of the motion picture.

The State's part in the development of the industry can be tied in with the life of Thomas A. Edison, the accomplishments of the Rev. Hannibal Goodwin, and the early films produced at Coytesville, Fort Lee, and West Orange.

It was in the year 1886 that Edison, working then in his Newark laboratory, determined that he would like to give the phonograph, which he had just devised, "eyes as well as ears." He dallied with the idea of a machine that recorded and transmitted not only sound but sight.

With the assistance of William Kennedy Laurie Dickson, a young Englishman, Edison went to work on the reproduction of pictures on a cylinder. The solution of "roller photography" by George Eastman, of kodak fame, resulted in the Edison Kinetoscope, forerunner of the modern motion-picture camera.

But another chapter of the motion picture was being written in Newark. The studio of John McDougal in Newark, a photographer and painter of miniatures, was the rendezvous for many creative minds, among them the Rev. Hannibal Goodwin. The latter had a flair for amateur chemistry, and in the attic of the rectory still standing in Newark, one may see the acid stains on the walls of his workshop. Goodwin began to tinker with a new zinc-etching process of making printing plates. This led him into etching photography and resulted in his invention of a film base to take the place of glass plates in the camera. The film was not celluloid, but a related nitrocellulose compound.

The Edison Kinetoscope, a peep-show machine, created a demand for films, resulting in the building of a studio in West Orange for the making of motion pictures. This was in February, 1893. It was the world's first motion-picture studio, and was swung bridge fashion from a pivot post, so as to permit the swinging stage to follow the light of the sun. The sincere and whole-hearted photography of that primal day demanded maximum contrast. The performer stood in the full glare of the little sunlit stage against a black background. The resulting picture was hard and sharply defined.

The peep-show business, however, began to drag, and the owners were forced to look about for a machine that would project the "entertainment" on a screen. Then came the Vitascope, which was an improvement on the Kinetoscope. Nickelodeons mushroomed all over the country. People who owned empty lots and had a few hundred dollars put up the "open air" places that are well remembered by everyone who can go back to the first decade of the current century. The movies were now on their way toward becoming an industry.

Edwin S. Porter, an employee of Edison, determined to produce a "super-picture" around several dramatic situations. It was "The Great Train Robbery." Porter directed the simple story of a hold-up, a pursuit, a dance-hall episode and a final escape. He gathered his players and went to work. The first move was to secure the loan of a train from the Lackawanna Railroad. The company went out "on location" near Paterson. The bridge over the Passaic River was used for a scene where a man was supposed to be tossed from the moving train. The "wild-riding scenes" on horseback were made in Essex County Park.

As a result of this crude but earnest effort, "The Great Train Robbery," the first "super-special," was made in New Jersey. The picture also served to introduce to early amusement patrons G. M. Anderson, who later carried the Westerns, as frontier pictures were called, to a high-water mark of the period under the name of "Broncho Billy."

MAIN STAIRWAY, STANLEY THEATER—JERSEY CITY

MEZZANINE, LATEST AND LARGEST OF THE GREAT STANLEY THEATERS—JERSEY CITY

The "movies" were at last under way. Better and longer dramatic productions came quickly when new mechanical contrivances perfected the recording and projecting cameras. Stories were soon filmed with a semblance of continuity and directors began to pay attention to a rhythmical, intelligent and dramatic unfolding of the plot. Greater and greater became the influence of the films on the stage and many legitimate "names" were conscripted for cinema work.

Developments in the second decade of the century caused imaginative showmen to start dreaming of vast motion-picture temples. Meanwhile a foreseeing lover of the screen was already planning the erection of a mammoth theater. He was Jacob Fabian, of Paterson, who built the Regent Theater, a 2500-seat playhouse to be devoted exclusively to motion pictures. This theater was opened in August, 1914. Shortly afterward came the Branford Theater at Newark, representing an investment of $2,000,000, and this was followed by the beautiful Mosque Theater in the same city.

Mr. Fabian then helped organize First National Pictures, Inc., one of the largest producing firms. A little later, he commenced the construction of an impressive playhouse in Jersey City, the largest municipality in Hudson County, and one of the most important in the State. The outcome of this project was the Stanley Theater, a 5000-seat motion-picture house of great architectural beauty, that still ranks first in size among Jersey playhouses.

STATE NURSERY FOR FOREST SEEDLINGS WHICH ARE DISTRIBUTED TO LAND OWNERS FOR REFORESTATION

Located in Washington Crossing Park, near Trenton

Chapter X

Insurance and Finance

INSURANCE

Life Insurance

The Prudential Insurance Company of America was formed primarily to provide for the insurance needs of the industrial classes, although after the first few years, regular ordinary policies were also issued. The origin of industrial insurance may be traced to the burial clubs and friendly societies of the wage-earners in England.

The English Prudential began to issue weekly premium policies in 1854. Years later, Elizur Wright, the distinguished insurance commissioner of Massachusetts, in discussing the British companies called attention to the success of the Prudential, but few believed that a similar institution could be developed in this country. The late John F. Dryden became convinced, however, that this system could be adapted to the requirements of the American public.

Conditions then were unfavorable to any new insurance enterprise. The panic of 1873 had sent banks, savings institutions, and commercial houses tottering to disaster; more than half the life-insurance companies had failed or gone out of business; the number of policyholders had been very largely reduced; distrust was the rule, and confidence the exception; capital was timid, and laboring men suffered from conditions which no one seemed able to remedy. A broad faith in the instincts and hopes of the wage-earning classes and a prophetic vision of what might be achieved were therefore necessary to the introduction of industrial insurance to America.

On February 18, 1875, "The Widows' and Orphans' Friendly Society," which had been chartered in New Jersey two or three years earlier, was acquired and reorganized as "The Prudential Friendly Society," actual organization being effected October 13, 1875. The title was changed in 1877 to "The Prudential Insurance Company of America."

At the close of 1879 the 26 companies transacting ordinary business in the State, some of which were over 30 years old, had a total of only 17,318 policies in force in New Jersey. The newly launched Prudential (its first policy being issued November 10, 1875) was weak financially, and had to struggle hard to overcome a variety of adverse factors which nearly terminated its existence. Eventually, however, the efforts of the management were successful and the company attained a measure of stability. The partial solution of a great social problem was slowly emerging from the chaos following 1873.

The creation of an organization to sell an idea to people who were striving for the bare necessities of life was difficult. In all the years before, life insurance had been offered in amounts of $1,000 or more with premiums payable quarterly, semi-annually, or annually, and these conditions practically debarred the wage-earners of that period from the benefits of protection.

The distinctive features of industrial insurance were, first, the adoption of the weekly premium, three cents, five cents or multiples thereof, as the unit of value; second, the adjustment of the amount of insurance to this premium, which necessarily meant an irregular sum instead of the even amounts for which ordinary policies were issued; third, the collection of the premium at the homes of the insured by the agents of the company; fourth, the fact that every member of the family from infancy to old age could be insured. The last was revolutionary but vital. The chief need

GIBRALTAR BUILDING

One of the Prudential Insurance Company buildings in Newark. Cost $7,000,000. It is the latest in the group of Prudential buildings which are a distinctive feature in the business center of Newark. It covers an entire block, is 14 stories high and houses several thousand employees.

was to provide a burial fund, since the family seldom had more than the weekly income, which was usually spent almost as soon as received. Thus the regular payment of claims very promptly after death, when money was so urgently needed, created confidence.

The Prudential, while organized and continued as a stock company until 1915, distributed benefits to policyholders largely in excess of contract obligations, as it became apparent by actual experience that the rates warranted such action. In the first 20 years these concessions amounted to about $630,000,000. The paramount interest of policyholders led to the mutualization of the company and to the conduct of the business on a basis of net cost to policyholders for all forms of life insurance. A large proportion of industrial business is issued without medical examination, and the company's mortality experience has been increasingly favorable.

An extensive health service has been developed in the Prudential laboratory, and during 1927 over 90,000 examinations were made. Educational health pamphlets are circulated, and co-operation also is extended to national health agencies.

In dealing with the company's investments it is believed that one of the best methods of aiding the community at large is to facilitate individual home ownership and to assist in providing additional housing accommodations. More than $864,000,000 is invested in farm and city mortgage loans, and in spite of the fact that many are for substantial amounts, the average loan at the close of 1927 was only about $6,700.

Of late years much attention has been devoted to group insurance, which renders it possible for large employers to furnish needed protection to their employees.

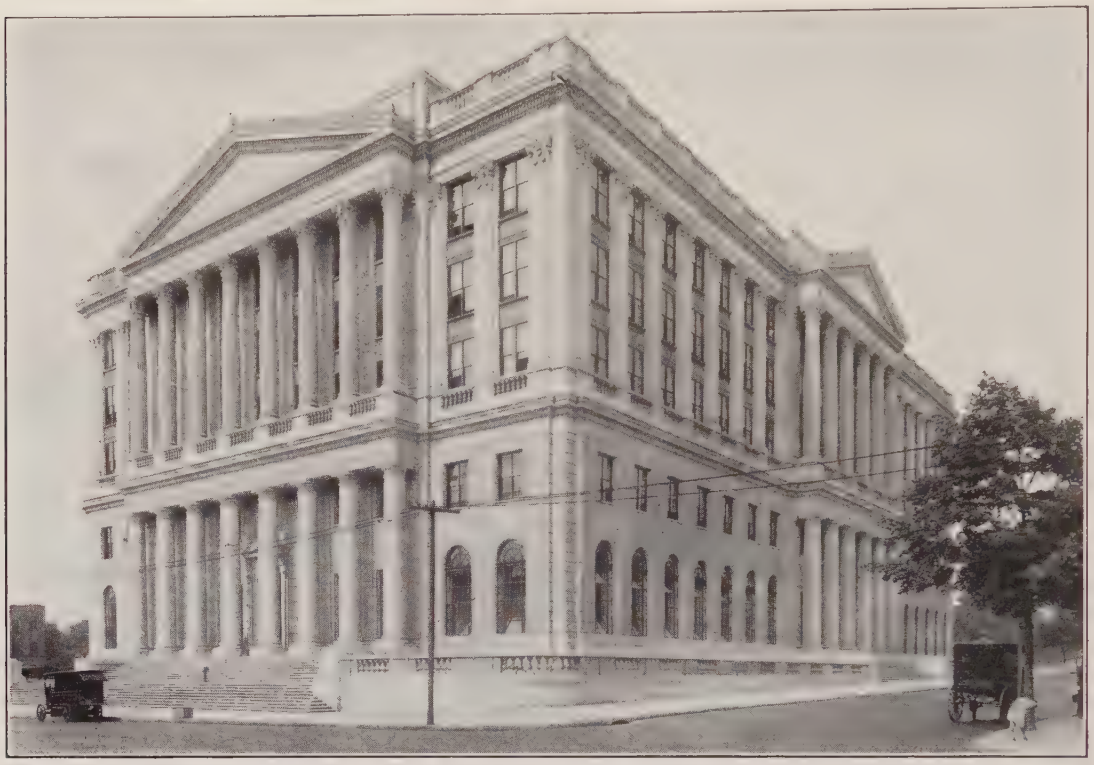
As of December 31, 1927, when the population of New Jersey was estimated to be slightly under 3,600,000, the Prudential had in force in the State, 3,078,927 policies covering over $610,000,000 of industrial insurance, and over $467,000,000 of ordinary insurance, or a total of $1,077,000,000. This protection covered approximately 2,052,000 individual lives, or 57 per cent of the population.

At the close of 1927, the company had over 9,000 employees. Mortgage loan investments amounted to more than $59,000,000. Taxes and license fees, state and local, were $4,085,000, and claims paid during the year were $9,313,000.

In addition, the Prudential had the largest amount of industrial insurance in force of any company in the world. With all forms of insurance combined, it ranked second. On that date its policies in force were: Industrial, 28,990,265, for the amount of $6,190,095,455, insuring approximately 19,000,000 lives; ordinary, 3,032,682, for $5,470,424,616, insuring approximately 2,000,000 lives; a total of 32,022,947, for $11,660,520,071, insuring approximately 21,000,000 lives. It had assets of $1,789,266,619.86 and its payments to policyholders in 1927 were $195,039,455.15. In addition to these payments there was credited in dividends to policyholders, both industrial and ordinary, $63,007,645.34. All taxes paid in 1927 were $10,949,606.78. In addition to the home office employees, there were 26,918 field employees.

During the World War the Prudential responded in every way possible to the call for patriotic service. The company itself purchased over $95,000,000 in various war loans issued by the United States and Canadian governments, and subscriptions made or secured by employees aggregated nearly $48,000,000. More important than all else was the fact that 1,729 representatives of the company, about ten per cent of its force at that time, were in the war in different branches of service. Of this number 50 were either killed in action or died. As a tribute to these loyal citizens who gave their lives, the company erected a memorial tablet over which American and Canadian flags are continuously draped.

When the Mutual Benefit Life Insurance Company was founded in 1845, it was decided that the company was not to be operated for the financial benefit of its members, and the company's funds were to be owned entirely by the policyholders, who were to elect the directors. Before the doors were opened there were applications for $400,000 of life insurance. By the end of 1845, or within nine months



HOME OF THE MUTUAL BENEFIT LIFE INSURANCE COMPANY—NEWARK

after it began business, it had issued nearly $2,500,000 insurance and had assets of over $55,000. The company has grown until it is among the leaders in strength, stability and size. At the end of 1927 it had 599,704 policies in force for $2,208,320,000. The assets were $482,180,628 and the surplus $18,797,092.

The company confines its business to the simple forms of insurance. Any reasonable desires of the insured with respect to the payment of premiums or to the settlement of the proceeds are complied with. The proceeds of a policy may be paid in one sum or may be distributed over a number of years, or a life income may be provided.

An excerpt from an advertisement of the company shortly after its organization stated that "Its funds will be applied to the furthering of the interests of its members." This pledge has been amply fulfilled. Since the organization and up to the end of 1927 the company has received $1,082,521,205 in premiums. There has been returned to policyholders or held for future payment to them a sum that exceeds the premiums paid by nearly $167,000,000. Of the total income of the company only about 13 per cent has been required for expenses, including taxes.

As rapidly as experience has proved such action to be wise, the Mutual Benefit has broadened and liberalized its policy contracts, this action being extended to old as well as new policyholders.

The company passed through the Great War and the epidemic which followed, and notwithstanding the increase in death claims and the higher cost of transacting business owing to economic conditions, it did not increase the cost of insurance to its policyholders.

The Colonial Life Insurance Company of America, whose home office is in Jersey City, has been built up upon a broad conception of service. The company was founded in 1897 by a group of Jersey City merchants, bankers, and attorneys who desired to create an organization to write both ordinary and industrial life insurance.

Starting with offices on the second floor of a building at 43 Montgomery Street, Jersey City, the company grew so rapidly that in a

short time the entire building was required. Here the company remained until its quarters were destroyed by fire on the night of December 13, 1926. New offices were then secured at Journal Square.

The Colonial writes ordinary, intermediate, and industrial business, and since 1906 all of the policies issued have been on the non-participating plan. The writing of group insurance was taken up in 1914.

Through its variety of plans, insurance is made available for all members of the family. The child, as well as the adult, can secure protection in the industrial department, and the business-man finds all his requirements met by the ordinary policies.

The Colonial has over 500,000 policyholders throughout the Eastern States. Its annual report for 1927 disclosed over $100,000,000 of insurance in force.

From the start, the Colonial's success has been built on sound financial and actuarial lines. In its investments care has been taken to protect the interests of the company from every angle, its moneys being chiefly invested in mortgages totaling many millions of dollars. Its policy clauses are liberal and its payments prompt.

Fire Insurance

New Jersey presents an attractive field for the formation and growth of insurance companies. The facilities provided for the investment of funds are excellent, being within a short distance of the New York and Philadelphia financial centers. Real estate can be acquired at reasonable prices for home-office and agency-office purposes. Labor conditions are such that a clerical force can be secured without difficulty, and excellent commuting facilities provide living conditions unsurpassed.

The first fire insurance company organized in New Jersey was the Newark Mutual Fire Assurance Company. The history of the company may be set forth briefly as follows:

In the early part of the Nineteenth Century property owners in Newark began to realize that fire insurance was of sound, practical value. A few took out policies in a New York or a London company. In 1807 a stable in

HOME OF THE GLOBE INDEMNITY COMPANY—NEWARK

LOOKING EAST FROM THE WINDOWS OF THE NEW JERSEY STATE CHAMBER OF COMMERCE

The tall building on the left is the new home of the Firemen's Insurance Company. Beyond is the Newark Athletic Club. Between these two is the Fiedler Corporation Building. Trinity Church spire is in the foreground and the Park Place terminal of the Hudson Rapid Transit Lines is in the background

Market Street, in the rear of Newark's leading tavern, which stood at the northeast corner of Market and Broad Streets, was burned. The prompt payment of loss was a powerful object lesson, and it was driven home with force after each fire, for it was not long before another insured building was burned.

In February, 1810, a mass-meeting was held "at early candle-lighting," in the Court House, when preliminary steps were taken to organize a fire insurance company among the citizens on a mutual plan. It was purely a public measure, without the slightest thought of individual gain. Its secretary was Joseph C. Hornblower, then a young lawyer, who afterwards became Chief Justice of the Supreme Court of New Jersey and one of its leading citizens. The company's business at first was carried on in Hornblower's office, and he handled most of it himself for a short time.

The corporation is now owned by the Royal Insurance Company of London and has grown rapidly during recent years. It operates as one of the Royal Group in a large part of the United States and Canada.

Other Fire Insurance Companies

In 1826 the New Brunswick Fire Insurance Company was organized with a capital of $50,000. Confining its operations entirely to New Brunswick and vicinity, it developed very slowly during the last three-quarters of a century. In 1927, the company was reorganized and is now operating in many states under the direction of the Home Insurance Company of New York.

The Camden Fire Insurance Association commenced business in 1841. An early history of this company refers to the fact that of the 13 original directors, two were ferrymen and innkeepers, one a gunsmith, one a shoemaker, and the fifth a sausage weaver. The company operated in a very conservative manner at first,—its income for the initial year being $147. The records disclose that no losses were incurred during that year. The concern was changed in 1870 to a stock company, and since that date has increased its capital several times.

The American Mutual Insurance Company of Newark was organized in 1846 by twelve of Newark's most substantial citizens. The company commenced business in an office on the second floor of the Daily Advertiser Building at Broad and Market Streets. It has grown rapidly, and is now operating through agency connections both here and abroad, transacting a considerable volume of fire and marine business in foreign lands through the American Fire Insurance Association and the Marine Office of America.

The Firemen's Mutual Insurance Company of Newark was organized in 1855 by Newark business men, a number of whom had served as volunteer firemen. Its beginning was small and its growth slow for a number of years, but it has become one of the great American companies controlling a number of small companies and operating successfully throughout an extensive territory.

Prior to the Civil War nearly all of the fire insurance companies in New Jersey were organized and operated as mutual companies. A history of one of the first companies organized contains the following statement:

"The original deed of settlement provided that the policies issued by the company should cover a period of five years, except on goods, wares, and merchandise, which might be insured for a shorter term. It also stipulated that every person insured should deposit, in addition to the premium paid, a certain sum for every hundred dollars insured according to the rates and regulations. These deposits were available for payment of losses and expenses after premiums had been exhausted, but if not required for those purposes or such portions as were not thus required, were to be returned to the insured at the end of the policy term."

The practice of most of the companies was to retain these deposits, giving to the insured some evidence of indebtedness in the form of script. Under reorganization arrangements the mutual companies were transformed into stock companies by permitting the owners of script to surrender their script holdings and secure therefor certificates of stock.

Following the Civil War and during the financial depression of 1873, there were few, if any, fire insurance companies organized. When the reaction set in after the depression

of 1873, a number of such companies were started with rather disastrous results. Several of them failed and others reinsured their business in larger companies.

Again from 1895 to 1925, financial conditions did not warrant the development of insurance companies, and the result was that very few were organized. During the last three years a large number of new fire insurance organizations have commenced operations.

Following is a list of the fire insurance companies in New Jersey: Ajax, Newark, organized in January, 1927; American, Newark, February, 1846; Atlantic City, Atlantic City, July, 1902; Camden, Camden, April, 1841; Columbia, Jersey City, March, 1901; Eagle, Newark, February, 1912; Eastern, Atlantic City, February, 1902; Essex, Newark, February, 1928; Federal, Jersey City, March, 1901; Fidelity, Atlantic City, August, 1919; Firemen's, Newark, December, 1855; Jefferson, Newark, December, 1927; Jersey Coast, Atlantic City, September, 1925; Merchants & Manufacturers, Newark, May, 1849; National Fire & Marine, Elizabeth, August, 1865; National Guaranty, Newark, August, 1925; Newark, Newark, 1811; New Brunswick, New Brunswick, May, 1832; New Jersey Manufacturers Association Fire Insurance Co., Trenton, December, 1921; Pavonia, Jersey City, March, 1928; Public, Newark, February, 1928; Seaboard, Atlantic City, May, 1924; Standard, Trenton, February, 1868; Sussex, Newark, June, 1928; and Universal, Newark, March, 1921.

Casualty

Casualty insurance has been used in New Jersey in a limited way during the last 25 years. The passage by the New Jersey Legislature of the Workmen's Compensation Act in 1909 gave rise to a demand for the organization of casualty companies.

The International Fidelity Insurance Company of Jersey City was one of the first to enter that field. It was followed some years later by the Commercial Casualty Insurance Company of Newark and the New Jersey Fidelity and Plate Glass Company of Newark, which latter company had been operating since 1868, insuring only plate glass.

The following are the casualty insurance companies in New Jersey: Bankers Indemnity, Newark, organized in 1926; Commercial Casualty, Newark, 1909; Globe Indemnity, Newark, 1911; Hudson Casualty, Jersey City, 1921; Independent Bonding & Casualty, Newark, 1926; International Fidelity, Jersey City, 1904; Liberty Surety Bond, Trenton, 1926; New Jersey Fidelity & Plate Glass, Newark, 1868; and Reliance Casualty, Newark, 1926.

Title

Besides life insurance, fire insurance, and casualty insurance, there is title insurance and also the guaranteeing of principal and interest on mortgages. The title insurance business and the guarantee business are highly developed in New Jersey. The neighborhoods centering about New York and Philadelphia were practically pioneers in title insurance and in guaranteeing the payment of principal and interest on mortgages. Large amounts of capital are invested in both lines. Most of the transactions in mortgages and property transfers in New Jersey are carried on under the protection of title insurance.

This form of insurance had its birth in Philadelphia over a third of a century ago. The growth of the business in the past five years has been marked. On January 1, 1917, there were but 10 title companies operating in the State as compared with 54 at the beginning of 1928.

The following are the title companies in New Jersey: Asbury Park, Asbury Park; Associated Bankers of the Oranges, East Orange; Atlantic City, Atlantic City; Atlas, Jersey City; Bankers, Westfield; Bloomfield of New Jersey, Bloomfield; Bond and Mortgage, Toms River; Caldwell, Caldwell; Camden, Camden; Central, Rutherford; Chelsea, Atlantic City; Citizens', Passaic; Columbus, Newark; Commonwealth, Paterson; Equitable, Passaic; Federal, Orange; Fidelity, Ridgewood; Fidelity Union, Newark; Franklin, Newark; Gloucester County, Woodbury; Guarantee, Passaic; Guaranty, Newark; Guardian, Newark; Investors', Paterson; Irvington, Irvington; Jersey, Elizabeth; Land, Camden; Lawyers, Newark;

Lincoln, Newark; Monmouth, Asbury Park; Morris and Essex, Caldwell; Mortgage, Paterson; National Commercial, Newark; Newark, Newark; North Jersey, Hackensack; Nutley, Nutley; Ocean County, Toms River; Passaic County, Passaic; Paterson, Paterson; Plainfield, Plainfield; Pompton, Pompton Lakes; Preferred, Westwood; Real Estate, Trenton; Realty, Hackensack; Security, Passaic; South Jersey, Atlantic City; State, Summit; Title, Newark; Trenton, Trenton; United Bankers, Paterson; United States Title of New Jersey, Newark; Watchung, Montclair; and the West Jersey at Camden.

BANKING

BANKING as an economic art was little understood in colonial days. The first "bank" in Massachusetts was nothing but a batch of paper money.

Banking has been described as the "handmaid of commerce." Need for it arises when commercial operations are on a scale large enough to require considerable sums of capital.

In colonial New Jersey, as in other colonies, uses were made, however, of the beguiling but disreputable "bill of credit." In 1709 the Government issued some of these bills to finance a military expedition of Jerseymen into Canada. A second issue was made in 1711, and by 1723 the Assembly was providing for bills to be issued as loans to individuals. About 1740 the home government in England, alarmed at the volume of "bills of credit" appearing in the colonies, endeavored to limit the issues. New Jersey and the other colonies were, however, impatient of restraint. A new "loan office" was provided in 1774, and the original issue of 100,000£ was followed by others. The consequences were the familiar ones of over-issue, depreciation, discontent, and disaster.

Despite the bitter lessons of the colonial and revolutionary period, the old will-o'-the-wisp was chased again after independence was won. Another "loan office" issue of money was made in 1786. Other forms of legal-tender paper as well were provided. By 1789 this paper had lost a good third of its value, and its course was downward. The ratification of the Federal Constitution luckily put a quietus on further issues.

The early banking needs in New Jersey were satisfied after a fashion through dependence on institutions in New York City and Philadelphia. Documents describe New Jersey as essentially agricultural down to the forties. But in the early part of the Nineteenth Century industrial and commercial activities had attained considerable significance in Trenton and Newark. In 1804 banks were chartered in both these cities. A third institution followed in New Brunswick in 1807. Five years later the first general law was passed creating six banks. The War of 1812 forced suspension of specie payments in New Jersey as elsewhere, but in the main these early institutions held their own. There appear to be no reports of failures until 1827.

After the panic of 1817 New Jersey gave banking privileges to manufacturing and transportation companies. In 1822 the Salem Steam Mill and Banking Company was incorporated, followed in 1823 by the New Jersey Manufacturing Company and in 1824 by the Morris Canal and Banking Company. In this period there was a rapid increase in bank incorporation. Ten banks were chartered from 1822 to 1824. The pace then slowed up, but in the period from 1834 to 1837 eleven new banks received power to operate.

Such rapid growth could hardly be healthy. From 1804 to 1836, 14 banks had wound up their affairs. Seven of these have been chartered in the period from 1822 to 1824. Then when the panic of 1837 hit the country New Jersey banks had to follow those in New York and Philadelphia in suspending specie payments.

Taking a hint from New York's experiment with so-called free banking, New Jersey enacted in 1850 a "General Banking Act." This act permitted banks organized or operated under its provisions to issue circulating notes against adequate securities deposited with the State treasurer. But this measure was not the success

that it was expected to be. Although by January, 1855, some 24 banks had been established under its provisions, only 10 remained in operation.

By 1855 the Legislature was again granting special charters. The new charters were, however, more drastic than those of the earlier years. Matters went well enough until the panic of 1857 descended upon the country. Specie payments in New York and Philadelphia were suspended. New Jersey banks naturally carried balances in these centers. Indeed the law forced them to do so to some extent because it required redemption of circulation in these cities. Hence suspension in their reserve-holding centers meant suspension also for the banks of New Jersey. But the State treasurer is authority for the assertion that the New Jersey institutions had come through the panic "generally sound."

Things went well until the outbreak of the Civil War. By December, 1861, banks in Boston, New York, and Philadelphia had suspended specie payments. The New Jersey banks inevitably followed suit. They, like many other Northern banks, suffered heavily because of losses growing out of Southern business. In 1863 the National Banking System was established. State bank issues were subsequently destroyed by a 10 per cent tax.

Almost from the outset New Jersey has been well represented in the National System. In 1865 a law was passed authorizing the incorporated banks to surrender their State charters and to join the National System. Only nine of the banks having special charters failed to avail themselves of the privilege, while all but two of the banks incorporated under the general banking law joined the National System. Thenceforward the National Banking System developed steadily in New Jersey. There are about 300 national banks in the State. In number they represent about one-half, while their resources constitute about two-fifths of the total resources of all the banking institutions of the State.

For several decades after the Civil War the State banks lost ground. By 1880, according to the report of the Commissioner of Banking and Insurance, the number dwindled to seven, while capital and surplus were a little over a million and deposits somewhat above two and a half million. Thereafter, however, the tide turned, and the number began to increase. Indeed in the period from 1885 to 1890 the number jumped from 10 to 22. For 15 years thereafter the combined resources of the banks steadily expanded. At the end of 1910 there were 19 State banks with something over $18,500,000 in resources. There are now some 40 such institutions with $111,000,000 of assets.

A striking development in the banking field, however, has been that of the trust company. Of the existing trust companies of the State, some of which represent converted State or National banks, only 20 were established before 1900. At the end of that year, however, the statistics published by the State banking department show that there were in existence some 29 trust companies with total resources of something over $57,500,000. Obviously some of these failed or were absorbed. But from 1900 to the end of 1927 the number increased to 207, while total assets jumped to $1,328,000,000.

In 1875 there were 40 savings banks in New Jersey, where now there are 28. Indeed the number has been hovering about that level since 1880. From 1875 to 1880 the deposits in savings banks shrank from almost $33,000,000 to a little over $19,000,000, but since that time they have been advancing steadily until today they run well over $270,000,000. In 1880, according to official statistics, the savings banks paid their depositors $686,138 as interest on their savings, but this had grown to $12,287,483 in 1926. In 1880 the average deposit in New Jersey savings banks was $262.56. It has now more than doubled, standing at $535.55 at the end of 1926.

The savings banks standing alone, however, by no means indicate the total growth of savings in New Jersey. Since the enactment of the McFadden Act by Congress in 1927 National banks are definitely authorized to establish savings departments. On the other hand there has been a rapid growth of the building and loan associations which have attracted members by the thousands.

Trust companies carried time deposits before

JERSEY CITY CHAMBER OF COMMERCE

NEWARK CHAMBER OF COMMERCE

THESE TWO BUILDINGS ARE OWNED BY THE RESPECTIVE CHAMBERS OF COMMERCE

the State banks did. In 1907 the time deposits of the trust companies had already grown to something over $68,000,000 while their demand deposits stood at $57,500,000. At the end of 1927 their time deposits totaled $525,278,000 and demand deposits $514,731,000. New Jersey National banks show an even more remarkable growth in their time deposits. It was not until the Federal Reserve Act was passed that National banks were authorized to accept time deposits as such. At the end of 1914 the demand deposits of New Jersey National banks totaled $173,670,000 while time deposits equaled $40,853,000. By the end of 1927 demand deposits grew to the respectable total of $367,013,000, but time deposits grew even faster, reaching a total of $434,380,000.

An interesting phase of the thrift movement in the United States has been the development of the school savings system. In 1921 there were 81 schools in New Jersey that had savings schemes in operation. These schools had an enrollment of 26,453 pupils, of which number 15,526 were savings depositors. At the end of the school year, $195,153.91 stood to the credit of the children on the books. By June 30, 1927, there had been a growth that the following figures eloquently proclaim: Number of schools, 553; number participating, 284,477; deposits, $1,593,616.50; net savings, $638,374.15.

Building and loan associations are not banking institutions, but they have a relation to the whole field of savings and investments. New Jersey stands high in the list of states that have fostered the building and loan association. In total membership it is exceeded only by Pennsylvania and Ohio. For the last year for which official figures are supplied, namely, 1926, the total mortgage loans outstanding were almost $722,000,000.

The organization of the Federal Reserve System was the greatest step forward in American banking since the establishment of the National banking system in 1863. Through the mobilization of banking reserves, through the establishment of rediscount and open-market operations and through the organization of an efficient scheme of clearing and transfer under the Federal Reserve, American banking has been made safer and more responsive to changing needs than ever before. New Jersey banking has naturally participated in these great achievements and New Jersey business men have benefited by them.

As membership in the Federal Reserve System is virtually compulsory for National banks it follows that all New Jersey's National banks are members of the system. For State institutions, however, membership is voluntary, the decision finally resting upon each bank's conception of its private interests and of its public responsibilities. Nine of the 39 State banks have joined the Reserve System. Of the 207 trust companies in the State at the end of 1927, 55 belonged to the Reserve System. Savings banks are not eligible for membership in the Reserve System. New Jersey banks eligible for membership in the Federal Reserve System have resources aggregating something over two and a quarter billions of dollars. The nine State banks, the 55 trust companies, and the 295 National banks of the State actually members of the system command between them $1,583,490,000, or 71 per cent of this aggregate.

Since 1903 the bankers in New Jersey have banded into a helpful association known as the New Jersey Bankers Association. The purpose has been to protect the competitive interest of New Jersey bankers and also to insure the development of sound banking in the interest of the public. Since 1913 the association has had a special committee studying New Jersey agriculture. The bankers as a whole have worked for good roads and have studied farm credit. The association meets periodically and is allied with the American Bankers Association.

The formal educational movement of bank men began in 1906. This is known as the American Institute of Banking. The membership of all the chapters is 2,359, while 1,553 students are assembled in classes.

Banks in New Jersey are in general supervised by the State or by the Federal Government, according to the source of their charters. Members of the Federal Reserve System are subject to the supervision of the Federal Reserve authorities. The National banks come under the control of the Comptroller of the Currency. The author-

ity of the State Banking Commissioner goes so far that he may throw into receivership a bank which he finds to be insolvent or which is not following the regulations.

LARGEST BANKS IN EACH CLASS

There are 17 banks in the State with resources in excess of $25,000,000. The two largest are the Fidelity Union Trust Company, in Newark, with resources rising $150,000,000, and the Trust Company of New Jersey, in Jersey City, with resources exceeding $86,000,000. The largest national bank in the State is the National Newark and Essex Banking Company, in Newark, with resources of more than $45,000,000. Among the savings banks, the Howard Savings Institution, in Newark, is the largest and its assets are close to $57,000,000. The State banks are generally of less size, the Trenton Banking Company leading with resources approaching $18,000,000.

Fidelity Union Trust Company

In May, 1887, the Fidelity Title and Deposit Company began business with a capital of $250,000. Four years later this capital was doubled and in 1903 it reached $2,000,000. During this period the company name was changed to Fidelity Trust Company.

The financial needs of Newark were growing fast and greater demands for financing on a larger scale had started the consolidation of banking interests. The Second National Bank, German National Bank, and the State Banking Company combined in September, 1901, and became the Union National Bank. The Fidelity Trust Company and the Union National Bank were merged in 1920 as the Fidelity Union Trust Company.

In June, 1927, the Fidelity Union Trust Company, through a stock control, merged with six other of the most successful banking organizations in Newark. Today it serves more than 150,000 customers,—a number equal to about one-third of the population of Newark. There are over 88,000 depositors in its savings department. The bank was one of the first to establish a trust department for the handling of estates.

Continuity of management has played an important part in the growth and affairs of the Fidelity Union Trust Company. In addition to its 45 officers it has 449 other employees. Many of the original officers were the fathers of the men who are now in charge. The Institution has 29 directors. The branches are served by five advisory boards comprising 49 members. The members of these boards represent a large share of the most prominent business interests in the State. Uzal H. McCarter, president of the trust company, was one of the dominant figures in the effort to secure branch-banking for New Jersey.

The Fidelity Union Trust Company is not only the largest bank in New Jersey,—it is the 36th largest bank in the United States. It has resources in excess of $150,000,000.

The Trust Company of New Jersey

At the session of the Legislature in 1913, General William C. Heppenheimer, the president of this bank, led the forces that secured a measure which has since permitted trust companies to establish branches.

Under this act the People's Safe Deposit and Trust Company, the Bergen and Lafayette Trust Company, and the Carteret Trust Company were consolidated with the Trust Company of New Jersey. These five institutions had been organized prior to that time by General Heppenheimer. He was the president of each. Subsequently the Legislature permitted the removal of the main office from Hoboken to Jersey City.

The company erected a 14 story office and bank building at Journal Square, where its main office is now located. It has since opened the People's Safe Deposit, Union City, Newark Avenue, and Jersey Avenue Branches. It also controls by stock ownership the Park Trust Company at Fourth Street and Park Avenue, in Weehawken, and the Monitor Trust Company, at Nineteenth Street and Park Avenue, West New York.

The combined resources of the Trust Company of New Jersey at the date of consolidation, September 20, 1913, were $17,656,778.78. On June 30, 1928, they were $85,762,329.13. On the latter date the capital, surplus and undivided profits were $12,450,107.05.

National Newark & Essex Banking Company

The National Newark and Essex Banking Company in Newark is the oldest bank in the state. It was started in accordance with an act of the Legislature passed February 18, 1804, "to erect and establish a banking and insurance company in the town of Newark."

Business began with a capital of $225,000 at the home of Sam Burnett on Broad Street, near Market, close by the present banking rooms. In 1859 the name was changed to the Newark Banking Company; in 1865 it became the National Newark Banking Company; in 1902 it merged with the Newark City Bank; and in 1918 with the Essex County National Bank, when it received its present name. The term "banking company" was used in its name because banks in England at the time of its origin were known as banking companies.

The company took over the Ironbound National Bank a short time ago and continues it as the "Ironbound Branch." The main offices are located in an imposing building at Broad and Clinton Streets. Throughout the century and a quarter of its existence, it has withstood all of the financial upheavals of the country and today it has resources of $45,000,000.

Howard Savings Institution

The Howard Savings Institution in Newark was incorporated March 16, 1857 and commenced business the following May in the office of the Newark Banking Company, then located at Broad and Bank Streets. In 1862 it purchased the building at 742 Broad Street and occupied it until 1883, when it moved to 768 Broad Street—its present location.

In 1899 it erected its present commodious building and in 1924 completed an addition that doubled its banking space. In 1927 a Branch was opened at Bloomfield and Clifton Avenues.

In 71 years deposits have increased from $16,280.16 to $50,089,098.60. The bank's surplus January 1, 1928 was $6,560,867.81 and its assets were $56,650,966.41.

The Trenton Banking Company

The Trenton Banking Company, largest of the State banks, was founded December 3, 1804, 28 years after the Battle of Trenton. Its career of service has continued over a century and a quarter. During all these years it has been known as "The White Marble Bank." In 1805 the old jail and courthouse property was purchased and remodeled for use as a banking house. Here the bank remained until June 21, 1919. Then the company moved to the new building where it is now located at State and Warren Streets.

The site of the present building has a romantic interest, for on this spot lived Abraham Hunt, who entertained Colonel Rahl, the Hessian commander, the night that Washington crossed the Delaware. In later years the old Hunt home was razed to make way for the Masonic Temple, but progress decreed that the Masonic Temple must follow its historical predecessor and now upon this location stands the home of the Trenton Banking Company.

The business of the bank has increased since it moved to its present quarters in 1919 and today its deposits of $14,000,000 are more than double those of ten years ago.

APPLE BLOSSOM TIME IN GLOUCESTER COUNTY

Chapter XI

Industrial Organization and Development

GROWTH AND IMPORTANCE OF INDUSTRY

Best placed of all the States of the Union in the things that make for prosperity and progress, New Jersey is recognized as ideally located and equipped to meet every requirement of modern industry. Filling the territory between the great financial and commercial centers of New York and Philadelphia, and with important cities of its own, the State is a natural center of industrial activity. It may well claim to be the hub of the country's busy manufacturing life. It is at the crossroads of commerce.

With deep-water frontage on either side from which the world's commerce sets out, with the great railroad trunk lines crossing it and with others terminating at its borders, New Jersey is in a most favorable position with respect to the shipment of merchandise to and from every part of the continent and to and from every port in the world. The interior of the State is traversed by thousands of miles of steam and electric railroads and by numerous navigable waterways, while a network of improved highways invites the use of the motor truck for low-cost short hauls.

Although of relatively small area, New Jersey's extensive manufactures puts it in sixth position among all the States in 1925 as to value of products and number of establishments, and seventh as to number of wage-earners and value added by manufacture.

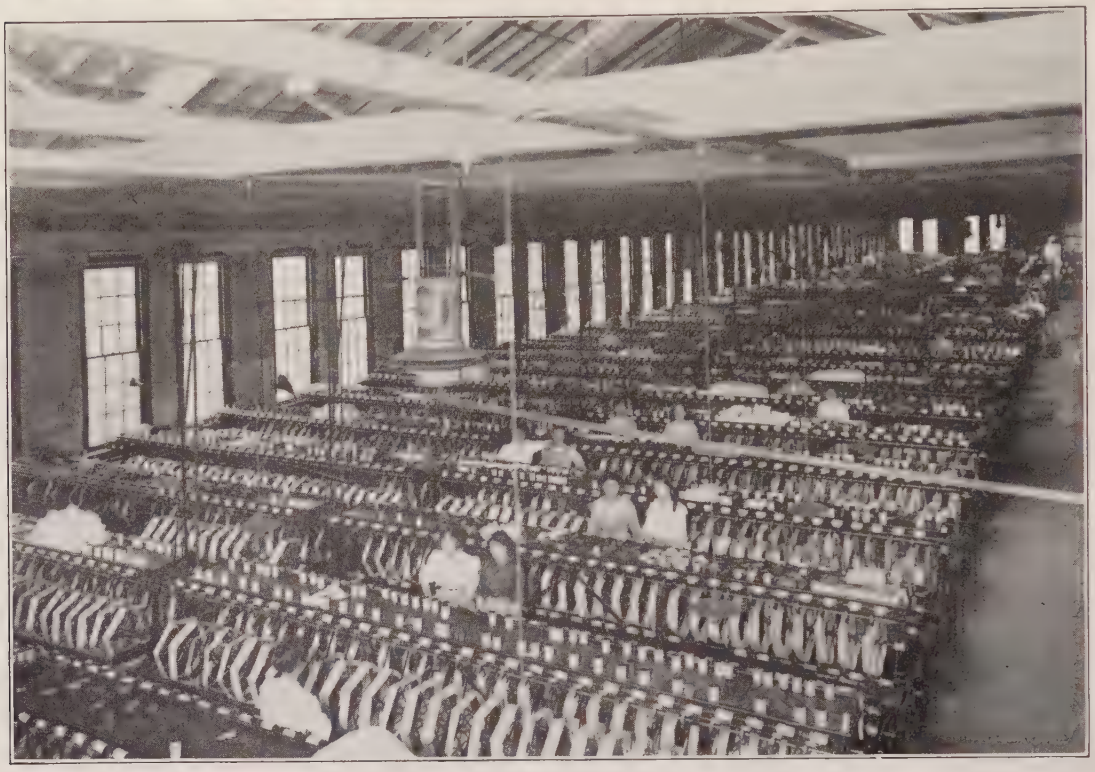
The 8000 and more establishments reported by the census in 1925 use over two billion dollars' worth of materials, to which they added a value of about $1,500,000,000, creating a total value of products of over $3,500,000,000. Over 400,000 wage-earners were employed at a total wage of more than $570,000,000. The machinery employed by these industries utilized over 1,250,000 horsepower.

The industries that have chosen to have their plants within this State are extremely diversified, representing nearly every possible field of industrial endeavor. Distribution of the major industrial groups within the State follows very closely the distribution within the nation as a whole. This can be seen graphically from Chart I.* The only instances where there is an appreciable difference is in the chemicals, paper and printing, lumber, and miscellaneous groups.

A comparison has been made on the basis of value added by manufacture, since that is probably the least misleading item reported by the Census of Manufactures. The value of products is often used, but since this includes also the value of the raw materials and the semi-finished products entering into the process, an industry using extremely expensive materials and adding little to the value of the materials is given an undue weight. On the other hand, the number of wage-earners is hardly satisfactory since industries having a large output, but relying mainly on machinery, would be unjustly topped by a less important industry which relied chiefly upon labor. The value added by manufacture, which is the difference between the value of the products and the cost of materials, seems to be the best unit of comparison, since it represents more nearly than any other figures available the actual value created by the industry.

The Census of Manufactures reports over 300 industries which are in turn classified into the 16 major industrial groups. Of these groups the most important, both for the United States and for New Jersey, is the textile and products group, which represents 19 per cent of the value

*These charts will be found at the end of the book.



WINDING AND THROWING IN A TYPICAL SILK MILL

added by all industries for New Jersey. Chemicals and allied products is the next most important, representing between 15 and 16 per cent of the value added for New Jersey. The third, fourth, and fifth places are held by machinery, iron and steel and their products, and food and its kindred products, which rank second, third, and fourth respectively for the country as a whole. The other groups vary from about five per cent for transportation equipment to a little less than two per cent for lumber and allied products.

Of the separate industries reported, electrical machinery, apparatus, and supplies lead for New Jersey with a value of over $9,000,000 added by manufacture, followed closely by silk manufactures and foundry and machine-shop products, both reporting an addition by manufacture of nearly $9,000,000. This can be seen graphically from Chart II. Petroleum refining, often conceded first place among New Jersey industries, ranks only sixth, representing only half as much value added as electrical machinery. On the other hand, if industries were to be classified according to the value of products regardless of the relative cost of the materials entering into the product, petroleum refining would be by far the leading industry, with electrical machinery reporting only half as great a value of product, and the smelting and refining of copper, which does not appear even in the first 15 industries of the chart, would be accorded second place.

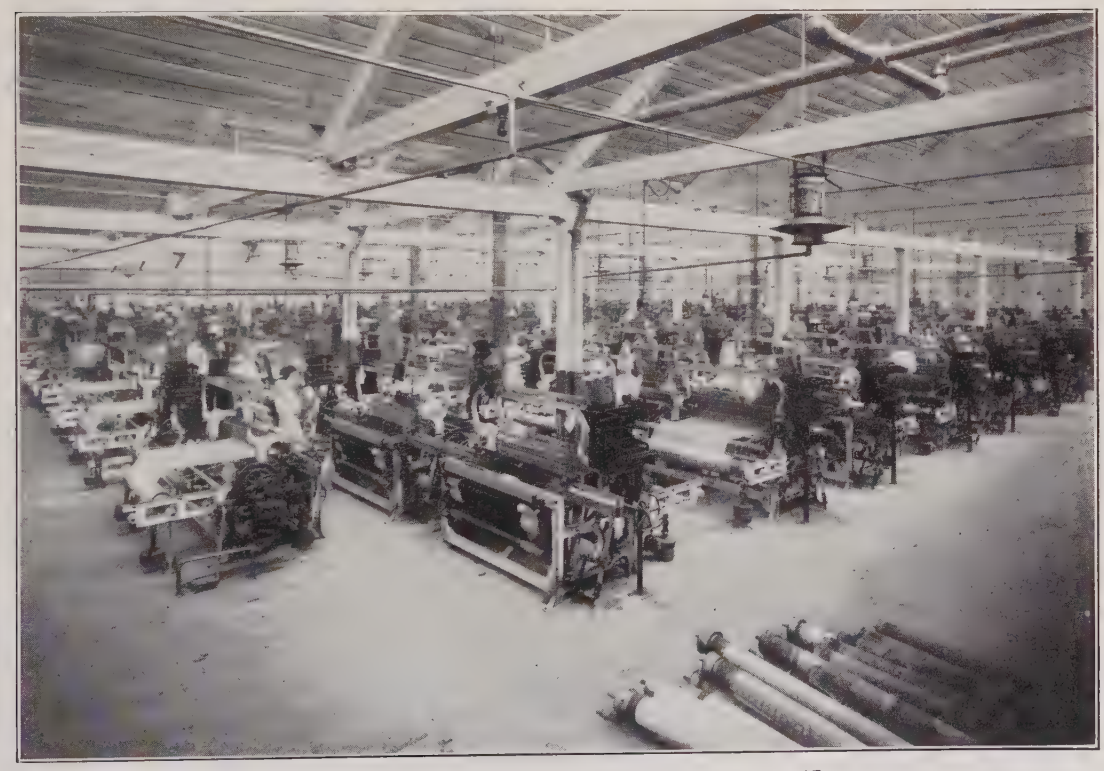
It is extremely difficult to find any standard for measuring the actual progress of industry within the State. Disregarding the error caused by the census in different years reporting for various sized establishments, any value figures will be distorted because of variations in the purchasing power of the dollar. However, certain price indexes have been computed which can be fairly safely used to correct this change. Although the value added by manufacture for New Jersey industries, which totaled $523,169,000 in 1914 and $1,452,326,000 in 1925, increased 177.6 per cent during that period, when corrected for change in price, the increase, of course, was not nearly so great. But these figures really mean very

little, because production has been increasing all over the country as well.

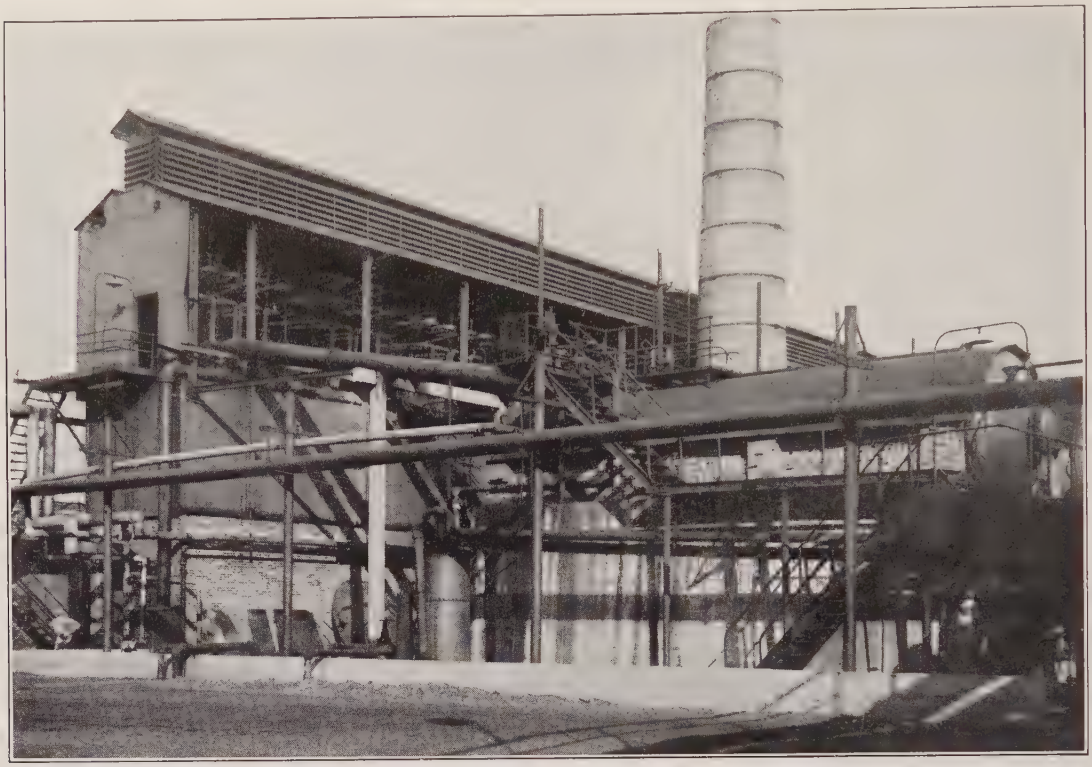
It would seem, then, that interest would be mainly as to the growth of New Jersey industry relative to the growth of the country as a whole. From 1909 to 1925 the percentage of value added to manufactures by New Jersey industries has never been more than 5.8 per cent of the total for the country as a whole and never less than 5 per cent, so that New Jersey industry has shown practically no unusual growth or decline in comparison with the rest of the country during the past 16 years.

Over one-fourth of the State's wage-earners are employed in the various textile and textile-product industries. This can be seen graphically from Chart III. The silk industries employ more than any other individual business. This can be seen graphically from Chart IV. The dyeing and finishing of textiles ranks third as to the number of employees, worsted goods fifth, and cotton goods tenth. The electrical machinery industry is the second largest employer of labor within the State, and foundry and machine-shop products have fourth place. Other industries employing 8000 or more wage-earners are chemicals not elsewhere classified, car and general shop construction by steam railroads, petroleum refining, cigars and cigarettes, rubber goods not elsewhere classified, steel works and rolling mills.

There are a number of industries which, although not always of comparative importance, are concentrated to a large extent in New Jersey. The refining of gold, silver, platinum, and copper represents 57.4 per cent and 33.7 per cent respectively for the total value for the country. Over 40 per cent of all the phonographs are produced in New Jersey, while linen goods, asbestos, textiles, artificial leather, blacking and stains, and polishes all report over 30 per cent of the total value for the country.



SILK WEAVING IN A TYPICAL NEW JERSEY MILL



PRESSURE STILL AND CONDENSING EQUIPMENT AT ONE OF NEW JERSEY'S LARGE OIL REFINERIES

GREAT INDUSTRIES

Petroleum Refining

Petroleum refining is one of the leading industries in New Jersey, both in relation to other industries within the State and to refining by other States. In 1925, the most recent census year, petroleum refining ranked as the sixth most important within the State on the basis of value added by manufacture, and New Jersey rated third among the States on the same basis.

Although there are in New Jersey only eight refineries, or a little over two per cent of the total number for the country, these refineries are equipped to run 261,000 barrels of crude oil daily, which is more than one-tenth of the total crude oil production of the United States at the present time. In the matter of refining capacity New Jersey stands fourth among the States, being surpassed by California, Texas, and Oklahoma in the order named. Most of these refineries are situated in Union and Hudson Counties, although there is one in Middlesex County and one in Gloucester County.

The census reports of 1925 give an employment of a little over 9,000 wage-earners, but a later survey has shown the refinery employment to be about 13,000. Actual figures of capitalization are not available, but a competent estimate would place the capital invested at about $200,000,000.

One of the earliest problems of the oil industry was that of transportation of the crude petroleum, since the refineries were mostly far from the oil fields. At the start oil was run into wooden barrels, which either were carted or floated on barges to market. Next came large wooden tanks which were mounted upright on flat cars. Finally there appeared the horizontal cylindrical steel tank car of today.

Wooden conduits had been laid for short distances, and the crude oil was pumped through

them to the refineries. These gave way to iron pipes and then to steel ones, until at present there is a network of pipe lines across the country. There are four main trunk lines from Kansas, Oklahoma, and Texas to the interior and to the Atlantic and Gulf seaboards. Myriad shorter gathering lines reach into every producing field of magnitude. Pumping stations are placed at intervals varying according to the topography of the country and the capacity of the different lines.

The volume of oil carried by these lines is enormous, amounting to 600,000,000 barrels in 1926. Although some of this oil moved only a few miles, a large quantity was pumped as far as 1,700 miles from the wells.

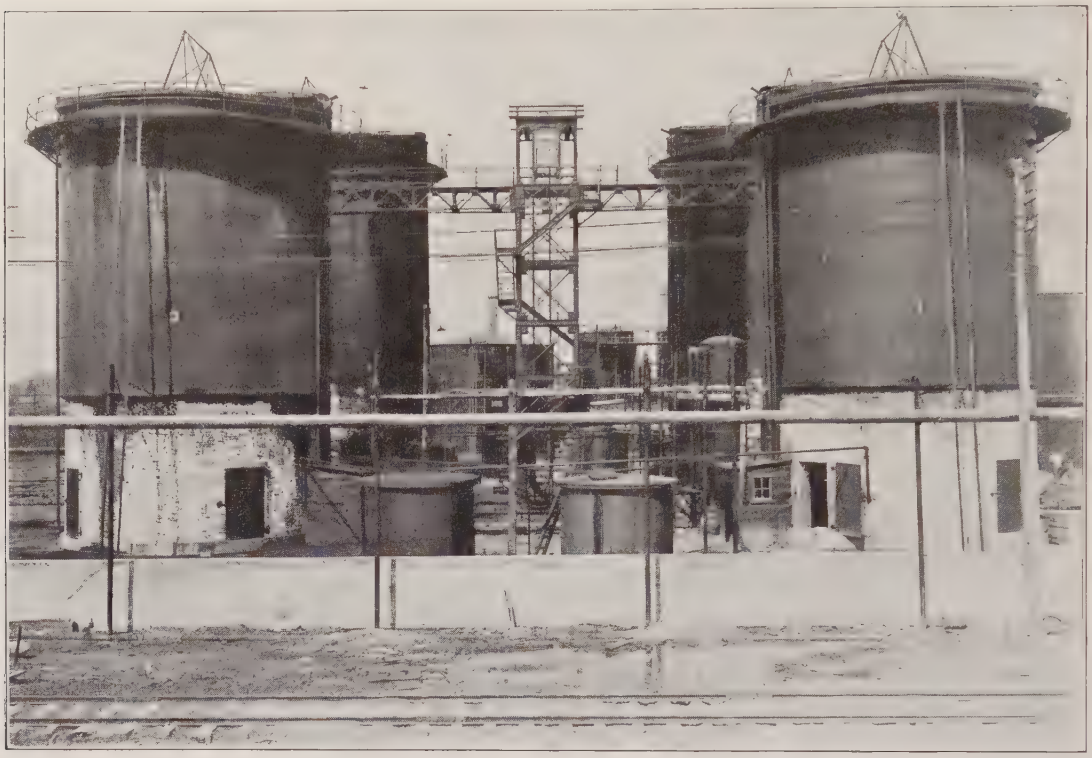
Another important means of transportation is the tanker, which is used to carry both the crude oil and the finished products. These tankers, carrying up to 100,000 barrels, can take on or discharge their cargo in a short time by pumps, either on board the ships or in the shore stations.

There are as many as 250 commercial products derived from crude oil, but the total output of this large number of products is not great. The bulk of all the petroleum produced is used in some way as fuel. It is burned directly under steam boilers, "gas oil" is used to enrich gas sold by the manufactured gas companies, another part similar to the gas oil is used in the great gas engines, furnace oil is burned in household oil burners, kerosene is used in lamps and stoves, and gasoline is employed for automobile fuel.

Beside the fuel oils there are the lubricating oils, which have nearly supplanted all the other lubricants. Refining also results in a large variety of asphalts for paving, roofing, and the manufacture of waterproof building-paper and shingles, and in the wax from which most candles are now made.

The percentage of these products obtained from crude oils depends to a large extent upon the characteristics of the crude oil itself. There are some which yield a high percentage of gasoline and kerosene and but little asphalt, and others which yield a considerable quantity of lubricants and asphalts, but only very little kerosene and gasoline.

CONTINUOUS TREATING PLANT AT A NEW JERSEY OIL REFINERY



AGITATORS AT TREATING PLANT, NEW JERSEY OIL REFINERY

Although the refining of petroleum is comparatively a recent industry, the ancients were able to profit by the crude distillation carried on by nature. In those days, of course, only such oil was known as seeped to the surface, and this was slowly distilled by the sunlight, leaving a heavy residue not unlike that left in the stills today after the lighter constituents have been driven off. This residue or pitch was used as a cement in building, to make their boats waterproof, and to keep the air from human bodies in their embalming processes.

Petroleum is a complex mixture of hydrocarbons along with small quantities of sulphur, nitrogen, oxygen, and varying amounts of natural gas, water, and dirt. It is in general divided into three classes in accordance with the dominant chemical composition: paraffin base, asphaltic base, and naphthenic base.

The hydrocarbons composing petroleum are first separated into groups having similar composition and properties, and then their products are purified. Since the different constituent hydrocarbons have different boiling points, their separation is a comparatively simple process.

The petroleum is heated in a still until boiling occurs, when the temperature is maintained constant until the product which has that particular boiling point is all passed off and boiling ceases until the temperature is raised to the boiling point of the product next in the scale. Within 48 hours a batch of crude oil goes through the complete operating cycle of the first step in refining. These crude stills are of three kinds: batch or single-unit stills, where each still is operated by itself and the crude oil is boiled down until only coke remains; continuous running stills, where a number of stills are operated together and the crude oil is reduced to tar and drawn off or charged into another still and reduced to coke; and the pipe or blast stills, which are for skimming off some of the lighter fractions, leaving tar or fuel oil.

The gas passing from the stills is then sent through coils immersed in tanks of cold water

to be condensed, and the resulting liquid is let into a receiving house, where it is routed into the proper tanks.

These products are not finished, but must be usually subjected to further distillation and treating. Re-run stills are used to re-distill the several products and to separate them into smaller groups, the two major distillations of this operation being naphtha and refined oil or kerosene with a residue of gas oil. The naphtha and oil are next subjected to chemical treatment to remove impurities and to improve color and odor and to fix these properties so that they will not change during storage.

The increasing demand for gasoline, made necessary a process to give a higher percentage of gasoline than simple distillation gives off, so that today the process known as cracking produces a light oil such as gasoline from a heavier and less valuable stock. This is performed with abnormal heat in a pressure still in which the molecules of the heavy oil are broken down into smaller hydrocarbons of a lighter gravity and lower boiling point.

Silk

Introduced into the Celestial Empire by the Empress Si-Ling-Chi about 1703 B.C., and into Europe by two Nestorian monks under order of Justinian in 552 A.D., started on this continent (in Mexico) by Hernando Cortez in 1522, and pursued to a considerable extent in Virginia in 1609, the silk industry reached a rank of great importance among world industries. In the United States in 1925 it attained huge volume, occupying 1659 establishments with 142,271 employees and having a total value in products manufactured of $808,979,394.

New Jersey's part in this great business has always been important and the value of manufactured silk products in this State in 1925 reached $190,712,394, or 23.6 per cent of the value of all silk products manufactured in the Union.

In Colonial days in America silk was manufactured entirely in the home. It was reeled by hand, thrown or twisted and doubled by hand

BATTERY OF CONTINUOUS CRUDE STILLS, AND STILL HOUSE
New Jersey Oil Refinery

and woven on the primitive foot-power loom by the women of the family. The first silk mill seems to have been started in New England in 1810. New England may possibly claim priority in silk dyeing also, but much experimental and constructive work was accomplished in Paterson. It was here, in this acknowledged "Silk City" of America, that the science of silk dyeing had its beginnings. John Ryle was the "father of the silk manufacturing industry in Paterson." To him credit is due also for the introduction of the art of silk dyeing in the decade following 1840.

The chief improvements in silk manufacturing during the second part of the last century were: (a) The introduction of the Rixford roller for doubling and twisting silk; (b) the introduction of a machine for making sewing silk, patented by Fr. Cheney in 1847; (c) utilization of cocoons, from which the silk moths had emerged; (d) introduction in 1882 of the Grant reel, which created a practical revolution, not only in the silk, but in the cotton and worsted-winding industries.

The silk industry in New Jersey and generally in America owes its growth largely to labor-saving machinery. The raw silk in the last decades has been imported from Italy, China, and Japan, the United States being the largest importer of raw silk in the world. Silk dyeing developed along with the general growth of the silk industry, vegetable and artificial dyestuffs being used.

Paterson has made great contributions to this development of the American silk industry. Her location early appealed to the silk dyers because of the natural softness of the Passaic River water. In the fall of 1906 the East Jersey Water Company supplied the leading dyers of Paterson with an adequate amount of water by a special aqueduct, the system being extended in 1914. Some of the Paterson silk dyers, the Weideman Company in particular, have augmented their water supply by artesian wells.

In 1926 there were concentrated in Paterson 864 of the 1,155 establishments connected with the silk industry in New Jersey. Lodi in Bergen County is the second center of the silk industry, other establishments being distributed in Essex, Hudson, Union, Middlesex, Camden, Monmouth, Warren, and Hunterdon counties.

The development of the artificial silk industry is one of the romances of Twentieth-Century trade. Invented as a poor substitute for silk, it has come to a leading place among textiles. The increase in its use and production is perhaps unparalleled in the textile trades. Figures collected by the Silk Association of America show the increase of artificial silk production in the United States to have been from 2,445,000 pounds in 1914 to 16,526,700 pounds in the first half of 1923. Paterson, with its numerous artificial silk establishments, is one of the most important centers of this industry in the world.

Cotton and Fabricated Products

The importance of the textile industry in New Jersey and its high rank among the States has been underestimated. Owing partly to the early start of the industry in the New England States, textiles and their products have been associated in the public mind with that section. More recently with a partial shift of the industry to the Southern States, this latter territory has received attention by industrialists, politicians, and economists on matters pertaining to cotton manufactures and other textiles. These two regions have had publicity to such an extent that the textile industry has become identified in the public mind solely with them.

If New Jersey is compared with some of the other States, it is disclosed that it leads all the States in some textile products and stands well up the list in many others. The report of the Census of Manufactures for 1925 reveals that New Jersey in linen goods made 36.7 per cent of the total for the United States; in asbestos textiles, 35.9; in dyeing and finishing textiles, 21.4; in worsted goods, 13.2; in corsets, 12.0; in fur-felt hats, 11.8; in jute goods, 10.7; and in millinery and lace goods, 7.4 per cent.

An even better comparison of the position of New Jersey's textile business can be obtained by considering the value of the products turned out. It has been shown that New Jersey ranks first in two products, second in two, and third in four. She ranks first in this respect in dyeing and finishing textiles and in upholstering mate-

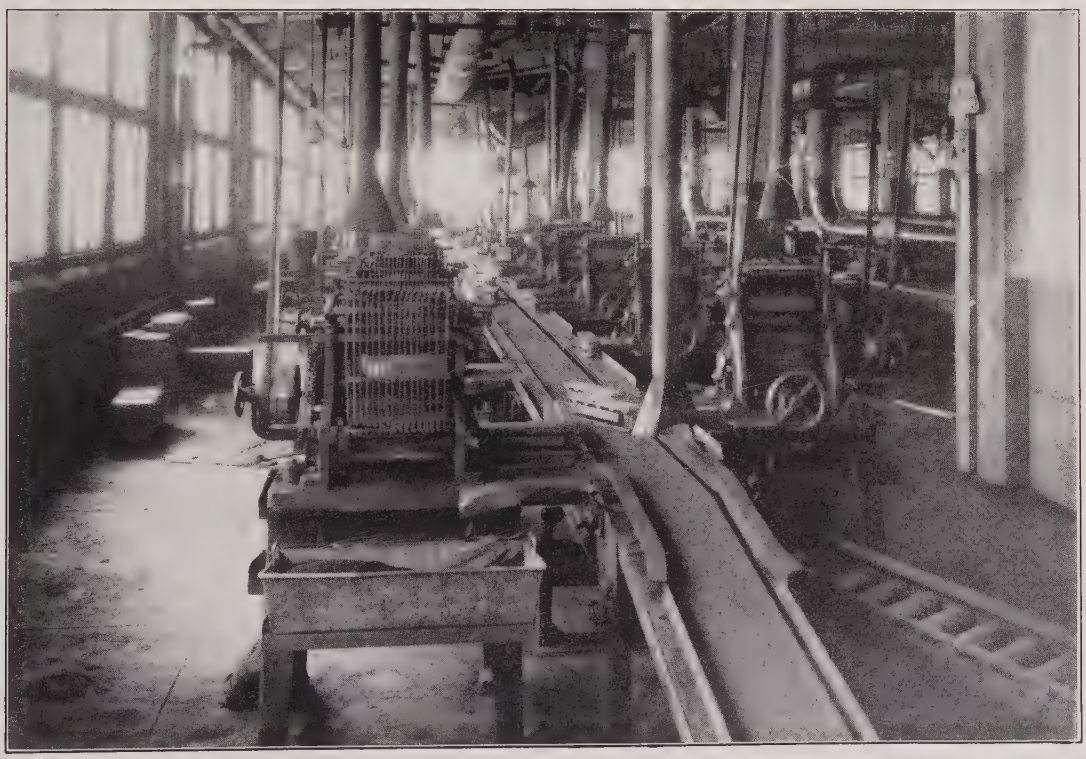
rials, second in oilcloth, linoleum, millinery and lace goods; third in men's furnishing goods, hat and cap materials, and corsets; fourth in fur-felt hats and in woolen and worsted goods; seventh in women's clothing, hosiery and knit goods; and ninth in men's clothing.

The lack of publicity given to an industry ranking as high as does the textile industry in New Jersey has not hindered its growth. Situated as New Jersey is in the center of a great population, with large markets nearby, with a large labor supply, and among numerous shipping facilities, the economic factors have attracted and nourished a large and flourishing industry.

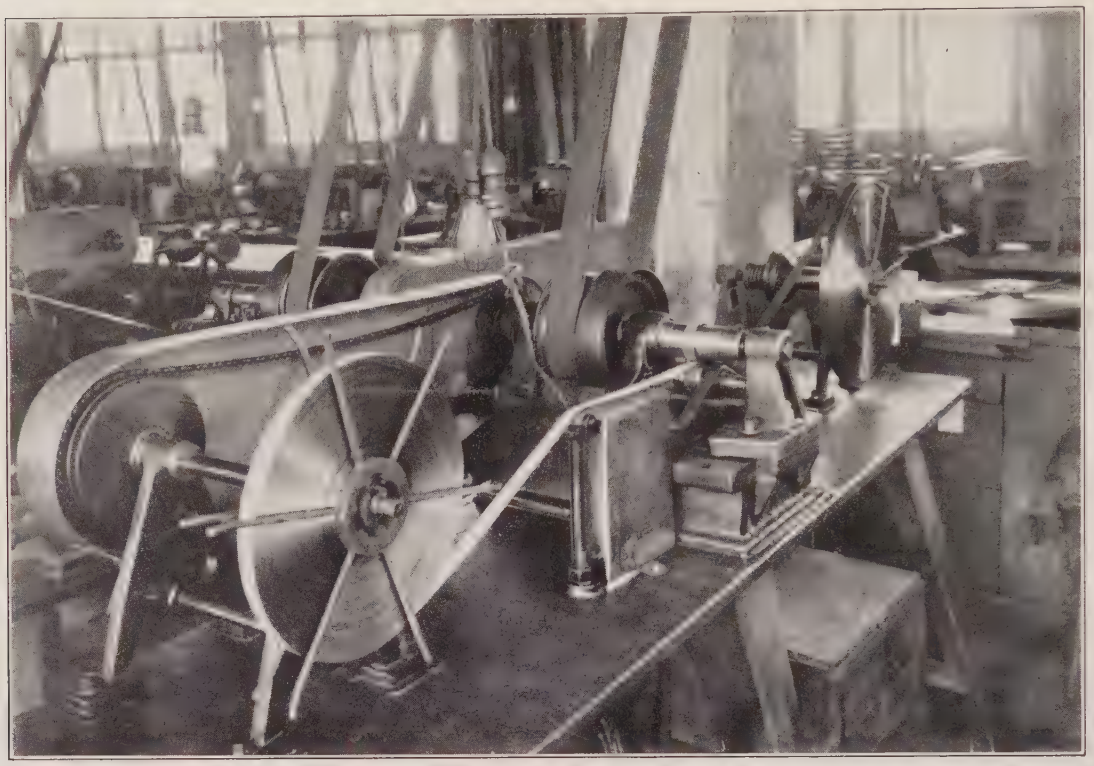
The importance to the people of the State itself of the textile industry is even more startling than its importance as compared with other States. Of her total wage workers employed in all industries, 20 per cent earn their livelihood in the textile industry. Of the total wages paid in New Jersey industries, textiles account for 17 per cent. This same business includes 16 per cent of all the State's industrial establishments, and is responsible for 12 per cent of the value of products manufactured.

The textile industry of New Jersey turns out over 30 groups of products ranging from worsted and woolen fabrics to rag carpets, linen belting, and elastic goods. This great business ranked first among the State's industries in the number of wage-earners employed in producing its products. In 1925 there were 85,724 workers. In considering the industry as to the value of the wages paid out, the sum in 1925 was $96,776,000. The value of marketable goods in 1925 was $429,550,000. The number of establishments making up the textile industry has increased nearly threefold in twenty-five years. There were about 550 establishments in 1904; there now are between 1300 and 1400.

Some of the firms manufacturing textile products are known throughout the country. Among the many are Forstmann & Huffmann Company in Passaic; Botany Worsted Mills in Passaic; Clark Thread Company; Johnson & Johnson in New Brunswick; New Jersey Worsted Mills at Garfield; Gera Mills at Passaic,



MACHINES WHICH LOAD THE NEGATIVE POCKETS WITH OXIDE IRON
Edison Storage Battery Company at Orange



PERFORATING CARBON STEEL RIBBON FOR POSITIVE TUBES
Edison Storage Battery Company at Orange

and the Millville Manufacturing Company at Millville. The New Jersey Worsted Mills cover 40 acres, with 11 acres occupied by factory buildings. The Certain-teed Products Corporation has a large plant at Trenton. The Congoleum-Nairn Linoleum Company, with 1300 employees, is another of these large firms.

The growth and importance of the textile industry in the State proclaim no peculiar miracle. With easy access to markets, in a heavily populated area, with exceptional transportation facilities by water and rail, centered in a large labor market, with raw materials in reasonable freightage distance, the past growth and the present importance of the industry are understandable. With these helping factors present, the future of Jersey textiles seems well assured.

Ceramics

The ceramic industries of New Jersey have been important since early Colonial days, when the rapidly expanding nation needed small plants for its brick, tile and stoneware. The United States owes to New Jersey much of the development of the ceramic industries.

The term "ceramics" was formerly restricted to pottery, but current usage includes all the silicate industries. The Greek word "keramos" held the idea of a product where fire acted upon earthy materials. Pottery is the oldest of arts. Primitive man fashioned the moistened clay into crude vessels and hardened them in the rays of the sun. The mud-walled huts of ancient times show an early knowledge of sun-hardened clay products. The opened barrows and tombs of Europe reveal prehistoric urns and vessels.

American pottery dates from the mounds of the Mississippi Valley, the pueblos of Colorado and New Mexico and the ancient tombs of Peru. In this State the beginnings antedate the Revolution. Records of 1659 reveal potteries in the Colonies producing tile, stoneware, and brick. Records of court sessions include a case apparently relating to the old Burlington Pottery, showing it as in operation in 1685, if not before. In 1738 Caspar Wistar

started a glass plant near Salem, sending to Belgium for glass workers. This plant operated successfully for 50 years, and the Wistars became influential citizens.

In Revolutionary times a few bricks were made at a small yard on Assanpink Creek at Trenton. Most of the brick buildings of that time were of bricks from Holland or England. There is also record of brick being made during 1780 to 1800 at Hamilton Square, near Trenton, and a little later at Maiden Head, now Lawrenceville. In 1831 Joseph Himer and Peter Grim of Philadelphia started a brick plant on the old Heddon farm at Trenton, about half way between the two city reservoirs, the brick in the original State prison being made by them.

In 1851 a brick plant was started at Roundabout, now Sayreville, in Middlesex County, by Peter Fisher and James Sayre. This firm branched out, and in 1887 merged into a corporation, the Sayre & Fisher Brick Company, one of the largest brick-making plants in the world. Excellent brick-clay deposits were found in the Hackensack district and in Passaic County, and the manufacture of common brick was carried on as early as 1872. But it was not until toward the end of the Eighteenth Century that the industry became firmly established.

New Jersey has played a large part in this development. She has made American sanitary pottery the finest in the world; the finest decorated china comes from her capital city; the greater part of New York's famous skyline is of terra cotta from New Jersey factories; countless industries here and in other States are dependent upon her for structural ware, bricks, and the refractories so essential in this age of metals.

Trenton became the center of the pottery trade in 1852, when the firm of Taylor & Speeler began to make yellow and Rockingham ware. The first cream-colored ware was made by William Young & Sons, and Millington & Astbury. In 1873 Astbury & Young and Thomas Maddock formed a partnership for the manufacture of sanitary ware, thus founding the sanitary pottery business in the United States. Thomas Maddock was born in England in 1818 of a long family of potters. In 1847 he went into pottery decorating in New York. This business was very successful, some of the ware being sold to the White House during the Pierce administration. Maddock believed that sanitary pottery could be made in this country. It was a tedious undertaking but he finally produced a satisfactory article.

New Jersey owes its prominence in ceramics possibly more to its advantageous location than to its own fine clays. The availability of labor and the proximity to the metropolitan market have done much to bring to the State those ceramic industries which are not fundamentally dependent upon New Jersey clays. This is particularly true of the white ware plants, such as floor and wall tile, china, porcelain, and hotel ware, which for the most part import raw materials, 90 per cent of the Trenton plants being of this type.

What undoubtedly started the industry here, however, was the abundant supply of brick and fire clays, some of the latter being unsurpassed for metallurgical and other high-temperature work. These clays are found mostly in the Raritan River district, with smaller deposits around Trenton, Toms River, and Hackensack. This proximity to clays suitable for kilns and burning equipment attracted other types of ceramic plants. New Jersey also proved to be the mecca for immigrant labor trained in ceramic work. These factors, combined with the ever-increasing demand for ceramic products, both art and structural, which has accompanied the growth of Philadelphia and New York as cultural and business centers, have caused New Jersey to be represented in practically every branch of the ceramic arts. Transportation also has played its part, as New Jersey has every advantage for obtaining the raw materials and disposing of the finished products.

While the State comes next to Ohio in the products of its potteries, it is first in the variety and quality of its ceramic wares, the city of Trenton leading all other cities of the country in output and quality. The advantage of natural gas has drawn some of the industry to other places.

The most important item is sanitary ware, for it has been in the development of the mod-

ern bathroom that New Jersey has been most active. Of second importance in output are the electrical porcelain supplies so essential in modern power distribution. The articles made in New Jersey include all shapes and sizes from little insulating tubes to great power line and radio insulators. Third in value are hotel and restaurant chinaware. The ceramic products made in New Jersey include glass, enameled wares, brick, floor and wall tile, terra cotta, porcelain and vitreous sanitary wares, tablewares, electrical porcelain, refractories, and art pottery.

Clay is a mineral resulting from the disintegration of certain rocks. It owes its value as a commercial material to its property of becoming plastic when mixed with water. It is then easily molded or worked into any desired shape, which it retains upon drying. This quality and its property of fusing gradually without distorting or melting, enable the potter to first form the piece or shape and then to fire it into a rock-like form. It is then hard and durable, resistant to both heat and weather. Modern methods employ molds into which the clay is pressed, much as in the casting of metals. This makes it possible to treat each piece separately without prohibitive cost.

For the cruder wares, such as brick and fireproofing, the clay is used as mined, being kneaded with water into a plastic mass in a pug mill. This mass is forced in a column through a die designed to give it the desired shape. The column is then automatically cut into standard lengths, which are carried on a conveyor to a drying room. The ware is burned in kilns holding from 40,000 to 100,000 brick, at a temperature of about 2200 degrees Fahrenheit. This process requires a long time, sometimes two weeks being taken in loading the kiln, firing and cooling, and then unloading. Some brick and special shapes are still made by the method of pressing into hand molds, and they are dried and fired in the same manner as the machine-made articles.

For large and complex shapes, such as tubs, sinks, and decorative units in which size and color are essential, it is necessary to add to the clay a proportion of preburned material which will undergo no shrinkage when fired. This preburned material is called grog, and is obtained by crushing up scrap material of various kinds. The mixture of grog and clay is tempered with water and made plastic just as in brick-making. The clay is then pressed into wooden or plaster molds. When very large and bulky shapes are made, much care is exercised in pressing and in drying and firing so that no weak spots or cracks occur. The drying process takes from several weeks to six months to complete.

The ware is then coated with a glaze or enamel, this being of the same material as the body, except that it is of the best quality. A fluxing agent is used that causes the glaze to melt easily and form a glassy and impervious coating. The color of the glaze is attained by adding metallic oxides which assume the desired tint upon firing.

For the finer clay white wares, such as floor and wall tile, tableware, electrical porcelain, and art pottery, the work is more complicated. Only white-burning clays can be used, and care is necessary to keep out iron and other impurities that would cause blemishes in the product. Because of the necessity of using only white-burning materials, the grog added to control shrinkage and warpage is made of pulverized flint rock. A third constituent of these white wares is pulverized feldspar, which fuses and bonds the clay and flint, making a dense and durable product.

In the preparation of the body and in forming the pieces, the white wares also differ from the heavier wares. The clay, flint, and feldspar are mixed with an excess of water in a blunger or paddle machine, producing a thick cream. This slip, as it is called, is run through a screen and across magnets, which serve to remove large particles and any iron which may have worked into the slip.

In the casting process this slip is poured into a plastic mold, and the cast is then dried and burned. Such wares as floor and wall tile, electrical porcelain, and heating units are made by drying the slip and then pulverizing it, the powder then being pressed into the required shapes. This process is used for quantity production of small pieces, the larger and finer

pieces being made by the casting or hand-modeling method.

After burning the pressed or cast shapes, they must be decorated. In this work the greatest skill is required, both in the preparation of the glazes and enamels and in their application. The pieces are coated with the glaze by dipping into a pot of glaze, by painting, or by spraying. In complicated designs the work is done either by hand or by a stencil.

The glazed ware is then again burned to a temperature calculated to develop the color of the metallic oxide used. In some cases it is necessary to make several successive burns if different colors are desired on the same piece and the proper colors are not obtainable at the same temperature. The success of pottery making depends largely on the skill employed in this burning.

As in other trades it is found advantageous to subject all pottery processes to technical control. Most plants employ men who check up on the raw materials and the operations. In this way the standard of the wares is maintained, and these modern methods effect greater production and lower cost.

That the State anticipated this need for technical men is seen in its provision for ceramic education. In 1903 a Department of Ceramics was established at Rutgers University, the State University of New Jersey, at New Brunswick. In 1922 this department secured an appropriation for a fine new building equipped to carry on all kinds of ceramic work and testing and to provide ceramic training for students desiring it.

The clay-mining industry, as distinguished from the manufacture of clay products, occupies a unique position in the State with respect to the qualities of the fine clays dug and the value of these clays. The first clay mined in the United States was retrieved from New Jersey soil. The first writer in English to discuss clays from a scientific point of view was Professor George H. Cook, on "The Clays of New Jersey" written in 1878.

When the long period of years during which clay has been dug in New Jersey is considered with the record of other States, and when it is recalled that New Jersey is not generally considered one of the great natural resource States, the showing of its clay-mining industry is exceptionally creditable.

The leadership of Trenton among the nation's cities as a center for the pottery industry and of Perth Amboy for the terra cotta industry attest the unexcelled clays dug in those neighborhoods. New Jersey's clays are basic clays, and 80 per cent of the quantity mined is absorbed in New Jersey's industries. While the Trenton potteries import from abroad or from Florida and Georgia their finer white clays, a large bulk of the raw materials may be obtained from the easily accessible pits about Woodbridge and Perth Amboy and along the valley of the Raritan river.

Jewelry Making

The jewelry trade of New Jersey is centered in Newark. Metals and jewels from all parts of the earth are brought to Newark to be submitted to various processes of refinement; gold from California, Africa, and South America; silver from Colorado and Nevada; platinum from the Ural Mountains in Russia; and diamonds, rubies, pearls, sapphires, and emeralds from remotest places. After being converted into articles of beauty they are sent back to the markets of the world.

Before a jeweler's window in the Square of St. Mark's, Venice, a Newarker of means heard his wife say: "Buy me that platinum ring with the ruby in it. I want to take back a souvenir typical of Venice; one that whenever I look at it will remind me of moonlit nights and gondoliers."

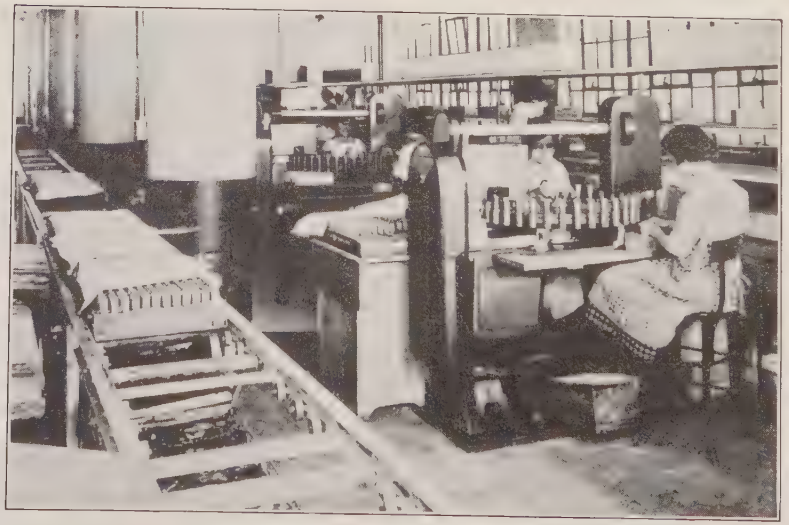
The man examined the ring, and being a jeweler himself, soon found that it was a product of Newark. In almost any part of the earth where jewelry is sold one is likely to pick up a Newark-made article, especially if it is of high quality.

One must go back a hundred years or more in Newark's history to find the beginnings of the jewelry industry. The "History of the City of Newark" says that "Benjamin Cleveland advertised himself as a gold and silver smith in 1792, while to Epaphras Hinsdale is given the credit of being the pioneer of Newark's great jewelry industry. Hinsdale was doing business

STERILIZING ROOM, JOHNSON & JOHNSON—NEW BRUNSWICK

ASSEMBLY ROOM, WESTINGHOUSE ELECTRIC PLANT—NEWARK

LAUNDRY SOAP MAKING AT COLGATE'S



FOLDING DENTAL CREAM TUBES AT COLGATE'S

in 1801, his factory being located on Broad Street, east side, a little distance north of Lafayette Street. A little later it was quite the fashion for ladies of means to drive up in their carriages to Hinsdale's to inspect his wares."

Another book, "Newark the Metropolis of New Jersey," says the first jewelry factory was started there in 1805 by Hinsdale and that six hands were employed, and continues, "Today Newark leads all the cities of America in the variety of fine jewelry produced. Here is where the machinery was built after special designs for the making of many of the popular articles known to the gold and silver industries of the world. Here are the best equipped establishments on earth. In Newark the manufacture of fine jewelry—gold and silver, watch cases, chains, bracelets, pins, rings, guards, chatelaines, pendants, lockets, ornaments and novelties, plain, engraved, and enameled, set with diamonds, pearls, and other precious stones—has established a standard of excellence for fully 60 years."

The first concern to give Newark jewelry a wide reputation was Taylor & Baldwin, whose handiwork caused Newark-made jewelry to be asked for because of its superior design. Their factory was in Franklin Street before 1820.

The industry grew rapidly. In 1830 there were 50 jewelers in the community. In 1836 there were four jewelry establishments, employing 100 and having an annual output of $225,000. In 1860 there were 27 jewelry establishments, employing 808 and having an annual output of $1,525,000. In the past 50 years factories have so increased as to give Newark the place she now holds in the jewelry world. In 1925 there were in New Jersey 152 jewelry establishments, employing 2,568. Of these there were in Newark 144 factories, employing 2,430. The cost of the raw materials used in the factories in New Jersey in 1925 was $11,157,342, while the value of the finished products was $23,113,692.

Nearly all of the factories make a general line and most firms specialize on one line. One firm makes one-piece collar buttons, another spring-back shirt studs, others mesh bags or vanity cases. Trophies, golf cups, loving cups, and prizes in silver are made in Newark by the thousand. The German Kaiser is quoted as once having said that a silver set made by a Newark house was the finest thing of its kind he had seen.

New Jersey also does a great business in smelting and refining. In 1925 there were 17 plants engaged in gold, silver, and platinum refining, employing 832 persons, with an annual payroll of $1,433,712. The cost of the raw materials used was $51,202,758, while the value of the products was $54,662,330. One of the largest platinum refining plants in the world is in Newark.

Besides jewelry making and refining there also are in New Jersey factories engaged in silversmithing, watch and clock making, electroplating, enameling and japanning, engraving, and making gold and silver leaf and foil.

Of the 152 such establishments in New Jersey employing 2,568 people, 70 plants employ between one and 10 persons, 34 plants between 11 and 20, 13 between 21 and 30, 13 between 31 and 50, and 17 between 51 and 100 persons. Among the larger concerns, one plant employs 125 persons. Four others employ from 150 to 400.

The majority of the best jewelry workers in New Jersey are of foreign birth or parentage and have the artistic way of doing things firmly implanted. They are mostly French, German, English, or Italian. The owners of the more important factories say that American youths do not often take up the jewelry trade.

Machine Industry

New Jersey's machinery industry is centered largely in Hudson, Union, Essex, and Passaic counties. This industry is the third most important in the State, and it employs more wage-earners than any other group excluding the textiles.

All manner of mechanical articles are made, chief among the industries being electrical machinery and supplies, foundry and machine-shop products, pumps and pumping equipment, textile machinery and parts, and machine tools. With the exception of electrical machinery, which has shown phenomenal progress in recent years and is now New Jersey's leading mechanical industry, foundry and

machine-shop products in the largest industry of this group.

The number of establishments classified as foundry and machine shops increased from 397 in 1904 to 472 in 1914. Since then there has been a slight decrease owing to the tendency to concentrate production in larger operating units. The value of foundry and machine-shop products has increased from $41,870,000 in 1914 to $110,202,000 in 1925.

The number of wage-earners in foundry and machine shops has remained relatively constant. This is because improvements in machinery and management have enabled productivity per man-hour to steadily increase, and thus an increased output has been secured without increasing the number of employees. The amount of wages has increased from $11,961,000 in 1914 to $31,013,000 in 1925. The value added by manufacture has increased from $25,619,000 in 1914 to $73,272,000 in 1925.

New Jersey ranked eighth among the States in number of foundries and machine shops, and seventh in wages paid, value of product, and wage-earners. In value added by manufacture the industry ranked third in New Jersey. The percentage of New Jersey value to total United States value for foundry and machine-shop products was 4.9 per cent for 1925, and the value for the machine industry, including all groups, was 7.8 per cent for 1925.

According to the value of its product, in 1925 New Jersey ranked first among the States in the production of hydraulic machinery and incandescent lamps, third in the production of clay-working machinery and laundry machinery, fourth in scales and balances, and fifth in ice-cream machinery, textile machinery, and pumps and pumping machinery.

In pumps and pumping machinery production New Jersey in 1925 ranked second in wage-earners, fifth in wages paid, and tenth in the number of establishments. In textile machinery production it ranked fourth in wage-earners and in wages paid and third in the number of establishments. In the production of typewriters and supplies New Jersey ranked fifth in wage-earners and wages paid and third in the number of establishments.

The industrial group, machinery, does not include transportation equipment, and there are therefore excluded such important industries as motor vehicles, motor-vehicle bodies and parts, and shipbuilding.

The industry designated as motor vehicles, and which is really the assembly of motor-propelled four-wheel vehicle bodies and parts manufactured either within the State or in other parts of the country, ranks ninth within the State as to value added by manufacture, it being $31,481,000 in 1925, with a total value of over $100,000,000. Both of the other important transportation equipment industries reported a value of approximately $30,000,000.

The motor vehicle industry has shown a remarkable increase since 1914 from a value of product of about $3,000,000 in 1914 to over $100,000,000 in 1925, and from about 500 wage-earners to nearly 5,000. Motor-vehicle bodies and parts have increased less rapidly from a value of about $5,000,000 in 1914 to about $31,000,000 in 1925.

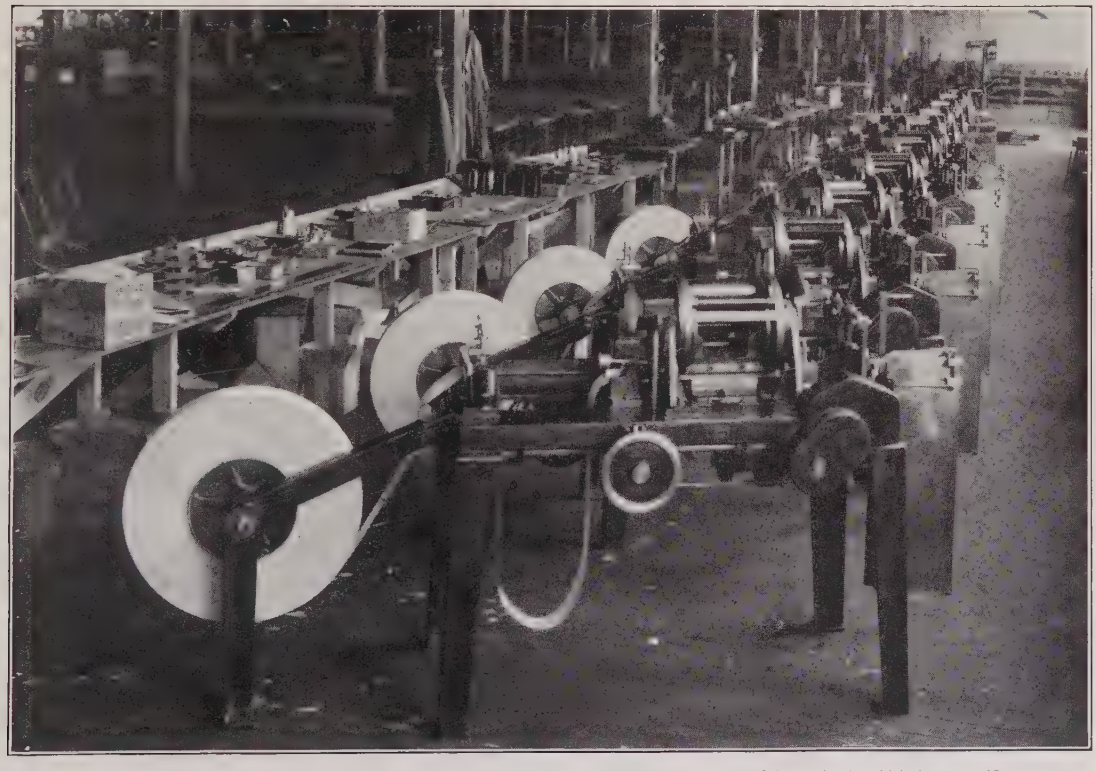
Electrical Industry

The electrical industry in New Jersey will be taken to include establishments engaged in the manufacture of machinery, apparatus, and supplies for employment directly in the generation, storage, transmission, or utilization of electric energy, and to exclude the manufacture of electric-lighting fixtures, electric signs, and motor-driven tools, washing machines, adding machines, and other machines with built-in motors.

The electrical industry has grown rapidly, the intervals of greatest expansion being from 1904 to 1909, and 1914 to 1919. The value of products in 1925 was 372 per cent of that in 1914, while the average number of wage-earners was only 65 per cent greater. This denotes a remarkable increase in the productivity of labor in the industry. Since the depression of 1921 there has been an uninterrupted growth in the industry, the value of products, and the value added by manufacture, being markedly in excess of the high point reached in the war-building period of 1919.

In estimating the magnitude of the operations of establishments in the electrical in-

INTERIOR OF SAND-SPUN FOUNDRY OF R. D. WOOD & COMPANY AT FLORENCE



HIGH SPEED CARD PRINTING PRESSES BUILT BY U. S. TOOL COMPANY AT AMPERE

dustry in the State during 1927, returns were received from only three concerns, but these included 40 per cent of the wage-earners and accounted for 30.1 per cent of the value of products in the industry as in 1925. On the basis of these replies the wage-earners may be estimated as 22,400, and the value of products as $167,000,000.

New Jersey has consistently maintained about the fifth place among the States in the production of electrical apparatus and supplies. In 1925 New Jersey was fifth in the value of electrical products, sixth in the value added by manufacture, and fourth in the horsepower capacity of prime movers.

Newark is the center of the production of electrical equipment in the State. In 1925 the product value of this industry in Newark was above $50,000,000, or about one-third of the State figure, and the number of workers employed was nearly 10,000, or about two-fifths of the State total. Jersey City, Trenton, and Bloomfield are also important centers for electrical apparatus. Equipment in excess of $12,000,000 was produced in Jersey City in 1925, and the value of electrical products in Trenton was about $7,000,000.

A number of widely known concerns are engaged in electrical enterprises in New Jersey. The General Electric Company has plants at Harrison and Bloomfield, Weston Electrical Instrument Corporation at Newark, Westinghouse Lamp Company at Bloomfield, Westinghouse Electric and Manufacturing Company at Newark, John A. Roebling's Sons Company at Trenton, Cooper-Hewitt Electric Company at Hoboken, and the Edison Lamp Works at Harrison.

The recent development of the radio industry has been shared by New Jersey. In 1927 the total radio business done in the State was approximately $4,575,000. There are about 50 large concerns manufacturing radio sets and accessories. The De Forest, Kolster, and Splitdorf companies produce sets; the Shamrock Company makes sets and parts; Swan-Haverstick Company manufactures accessories, and the Arcturus and Supertron companies make tubes. There are 19 radio-broadcasting stations in the State, 24 radio jobbers, 1,136 retailers selling radio equipment, and 312,000 receiving sets.

Shipbuilding Industry

The Shipbuilding industry puts New Jersey first among the States in the amount of capital invested per square mile, which is over $32,000, California coming next with $700 per square mile, and the average for the United States in 1914 being $400 per square mile.

With its 45 ship and boat-building establishments in 1925, with 7,652 employees and $27,413,659 worth of manufactured products, the State had 8 per cent of the number of establishments, employed 15 per cent of the wage-earners, and produced 15 per cent of the manufactured products of the United States in this industry.

In 1926 the number of men employed in the ship and boat-building industries reached 10,009 in the 29 most important establishments. These were distributed in eight counties of the State, as follows: Camden, eight establishments, with 8,006 workers; Hudson, five, with 1001 workers; Monmouth, five, with 49 workers; Union, three, with 763 workers; Bergen, three, with 103 workers; Cumberland, three, with 43 workers; Burlington, one, with 40 workers, and Atlantic City, one, with four workers.

Camden is the center of the shipbuilding industry in New Jersey. The city is built along two navigable rivers, the Delaware and the Cooper. There are several large shipyards here, and they are capable of making yachts of most exclusive design, as well as battleships. The navy dreadnaught Colorado and the giant airplane carrier Saratoga were built here. The largest shipbuilding enterprise in Camden is the American Brown Boveri Electric Corporation with 7,500 employees.

Tobacco Industry

The Tobacco industry in New Jersey employed 8,739 workers in 1925. There were 80 establishments, which paid $7,725,108 in wages and $27,277,969 for materials used. The value of all tobacco products in 1925 was $67,745,767, or 7.9 per cent of that of the nation. The 78 concerns manufacturing tobacco and

its products in New Jersey in 1927 were chiefly in the metropolitan district, as follows: Essex County, with 24; Middlesex, 19; Hudson, 8; Passaic, 11; Bergen, 5; Mercer, 5; Camden, 4; Union, 1; and Atlantic City, 1.

Leather Industry

In manufacturing leather, tanned, curried, and finished, the State ranked fifth among the States in 1919. With $7,500 per square mile invested in this industry New Jersey ranked first, Pennsylvania with $3,200 being second, while the average investment of capital in this business for the United States was $220 per square mile. The 449 establishments engaged in these industries were concentrated mostly in Newark and the metropolitan section generally.

According to the latest available official data, the Census of Manufactures for 1925, the leather industries of New Jersey paid $6,391,048 in wages to 4,888 employees, and expended $23,270,517 for materials used in manufacturing. The value of all leather products in the State totaled $39,699,484, or 8 per cent of the value of these same products in the nation.

Paint and Varnish Industry

The paint and varnish industry was represented in New Jersey in 1925 by 73 establishments with 2,899 employees. That year $4,230,162 was paid in wages in this business, $32,677,524 worth of materials was used, and the value of production reached $50,556,801, which is equal to 10.9 per cent of the total value of paints and varnishes produced in the United States in that year. In capital invested, $2,000 per square mile, New Jersey ranked first among the States, New York being second with $1,000 per square mile.

Of all the establishments of this industry, 85 per cent are concentrated in the metropolitan section of New Jersey, 28 establishments being in Essex County, 16 in Hudson, eight in Middlesex, five in Union, five in Passaic, and 11 in all the other counties.

QUARRY OF VULCANITE PORTLAND CEMENT COMPANY AT PHILLIPSBURG
Quarry 160 feet deep—Deposit 300 feet deep

Canning Industry

More than 10 per cent of all canned and preserved products, such as fruits and vegetables, pickles, jellies, preserves, and sauces, were manufactured in New Jersey in 1925. This State ranked first in the nation in the amount of capital invested in this industry per square mile and fourth in the total value of manufactured products, or $62,366,712. Of the establishments comprising this industry, 66 are in the agricultural section, mainly in Cumberland, Salem, and Gloucester counties. There were employed in 1925 in these establishments 4,814 wage-earners, who received $4,845,857. Over 36 million dollars was spent for the materials used in canning. This industry is growing, for the production of canned products in New Jersey, which was valued at about $2,000,000 in 1904, $3,600,000 in 1909, $12,000,000 in 1914, and $25,000,000 in 1919, increased to over $62,000,000 in 1925.

Packing Industry

Wholesale slaughtering and meat packing ranked eighth in the value of manufactured products among other industries of the State in 1925. Of the establishments of this kind 38 employed 3,040 persons and paid them $4,696,880 in wages. Over $73,000,000 was spent for materials and the manufactured products were worth $84,459,171. Hudson, Passaic, Essex, and Mercer counties are the chief sites for the establishments of this group, Trenton, Jersey City, Newark, and Passaic being the largest centers of slaughtering within the State.

Mineral Industries

The mineral industries of New Jersey are of much variety and value. In Sussex County, near Franklin, great zinc deposits are mined. In many places in Warren, Morris, and Passaic counties high-grade magnetic iron ore occurs, and it is actually mined near Washington, Dover, and Ringwood. In the northwestern section, including Warren and Sussex counties, pure limestone is obtained at some spots. Magnesian limestone is found here as well as in the northern part of Hunterdon County.

Cement rock of high quality is utilized by great cement plants near Phillipsburg in Warren County. Peat is found in some places and is made into fertilizers in Warren County. Talcose serpentine rock is found also in this county and is ground for uses similar to that of talc. Considerable masses of traprock, deposited in the northern section of the State, are quarried on a large scale and supply quantities of crushed stone of high quality for road making, for concrete, concrete blocks, and other purposes.

Middlesex County is famous for its deposits of clays, particularly refractory clays. In the southern part of New Jersey sand and gravel are abundant. In addition to ordinary building sand, in Cumberland County are found some high-grade special sands, such as glass sand, molding sand, and grinding and polishing sands.

Of the establishments connected with these industries, 69 in 1925 had 6,135 employees and paid them $9,074,802 in wages. The value of the products in these industries in 1925 reached $23,142,440, or 7 per cent of that for the nation.

Glass Industry

The glass industry was represented in New Jersey by 36 establishments in 1925, with 4,660 persons employed, $5,052,693 paid in wages, and a total value of manufactured products of $15,903,403. The glass products included art glass, automobile glass, glass beveling and designing, bottles, cut tableware, hydrometers, mirrors, and thermometers. The industry centers in Cumberland County.

Baking Industry

The banking industry ranks first among the other industries within the State in the number of establishments, or 917 in 1925; twelfth in the number of employees, 6,250 in 1925; and is thirteenth in the wages paid, or $10,266,376. The value of the products of the bakeries in 1925 amounted to $53,830,970. The units of this industry naturally are distributed over the State corresponding to the density of population.

There are many other important industries in New Jersey, all of which have played a part in giving this State a high ranking among the foremost states of the Union.

NEW JERSEY'S GREAT FIRMS

Victor Talking Machine Company

From meager beginnings in a tiny machine shop a little more than a quarter of a century ago in Camden, the plant of the Victor Talking Machine Company has expanded, until today with a capitalization of $43,070,000 it consists of 31 large modern fireproof and brick buildings with floor space of 2,534,000 square feet, where over 9,000 people are employed.

Eldridge R. Johnson, the founder, was a machinist with an imagination. Therefore when a man walked into his shop to have some minor repairs made on one of the first crude talking machines, the sensitive ear of the inventor was offended by the grotesque sounds that came from the curious toy, and with the inventor's enthusiasm for perfection, he set about making a machine that would really talk, sing, and reproduce instrumental music. His first objective was to perfect recording, and when that was accomplished, to construct a spring motor that would run evenly.

A total of $1,500 was all that could be spared for the first advertising effort. It was a start, however, toward one of the greatest continuous advertising campaigns, in which during the last 25 years there has been invested over $40,000,000.

A good machine, a good record, an organized business, and national distribution were not the only stepping stones to Mr. Johnson's success. When he could divert his energies from perfecting the machine and launching a new company, he began the work of securing the exclusive right to record the voices and music of the world's greatest artists of concert and opera.

Improvements have been made to the Victrola from time to time. The old horn type was replaced by the cabinet Victrola, which in turn had several changes, until recently there were introduced the Orthophonic Victrola and the Electrola.

When it was learned that the Bell Telephone Laboratories of the Western Electric Company and the American Telephone and Telegraph Company had developed both a new method of recording and a new talking machine far exceeding in range and quality the old recording and reproducing methods, the Victor Company investigated, and the right to use the new electrical recording process and the exclusive right to manufacture and sell the new reproducing instrument, which is now known as the Orthophonic Victrola, were acquired.

It is interesting that the principle of match impedance, which governs the design of the Orthophonic machine, is a mechanical application of the electrical principle which made possible long-distance telephone communication.

The Victor Company then placed on the market instruments containing both orthophonic reproduction from records and radio receiving sets manufactured by the Radio Corporation of America. Next came an electrical amplifying talking machine, developed by the General Electric Company, and marketed as the Electrola. In some of the larger Victor models, Radiola receiving equipment, orthophonic reproduction from records, and electrical reproduction from records are combined in a cabinet. A later development is the Automatic Victrola, which changes its own records.

Thomas A. Edison Industries

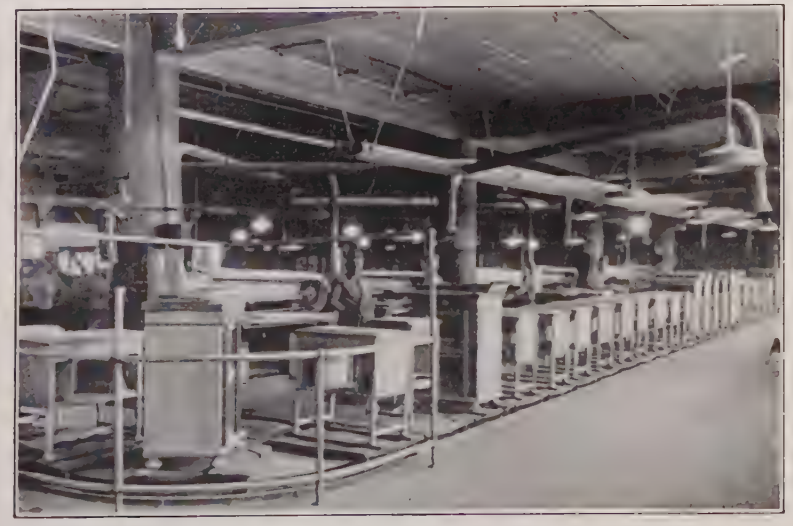
Revered as the master inventor, it is difficult to divorce Thomas A. Edison from the world—concept of him as a transcendent individual working alone like a great composer, sculptor, painter or writer.

So, to form a picture of Edison the manufacturer and Edison the financier, for the moment we must draw a veil over our image of Edison the inventor.

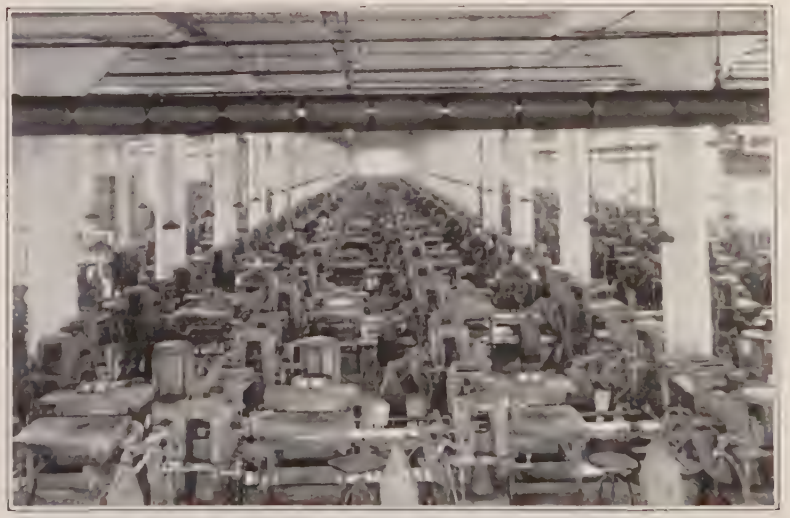
The Thomas A. Edison Industries, the "House of Edison," stands today a world-wide organization creating, manufacturing and marketing many different articles of merchandise through a number of major divisions, each operating independently of the other, yet all

POLISHING METAL PARTS FOR VICTROLAS

MAKING VICTROLA TUNGSTEN NEEDLES



CONVEYING VICTROLA CABINETS BETWEEN OPERATIONS



RECORD PRESSING, VICTOR TALKING MACHINE CO.—CAMDEN

responsible to the general executive board, of which Mr. Thomas A. Edison is Chairman and Mr. Charles Edison, President.

The main plants of Thomas A. Edison, Inc., the parent company, and one of its subsidiaries, the Edison Storage Battery Company, are located at West Orange, N. J. These plants include 104 buildings, large and small, many of them six stories in height, of which 85% are of re-inforced concrete, the largest being 1000 feet long. The most important products made in the West Orange plants are:

The Edison Nickel Steel—Alkaline Storage Battery
Edison Radio & Radio Phonograph Combinations
Edison Phonographs and Records
The Ediphone (Mr. Edison's dictating machine)
The Edicraft Siphonator, which makes coffee by a new process.
The Edicraft Toaster
Ediplate Seamless Electroplated Floats for steam traps and automatic regulating devices

Another plant of Thomas A. Edison, Inc., about five miles from West Orange, at Silver Lake, makes Edison Primary Batteries, chemicals for the Edison Storage Battery, Edison Radio and phonograph cabinets, wax masters for phonograph records and wax cylinders for the Ediphone.

It is interesting to note the number of diversified products of the Edison Industries. An example is that of Edison Portland Cement. Edison's entry into the cement industry arose through his nine years of experience in concentrating magnetic iron ore in the hills of New Jersey. To this experience he added many supplemental inventions of a basic nature, among them his invention of the long kiln, which on its inception was derided by his competitors, but which has since been generally adopted throughout the entire industry.

The Edison Portland Cement plant at New Village is a model one in every respect, equipped with all available modern labor-saving devices, and maintaining the integrity of its product (7,500 Barrels daily) by chemical and physical tests which are continued day and night throughout the year.

The latest product to be introduced to the country is the new line of Edison Radio Receivers, comprising both straight radio sets and radio-phonograph combinations. These receivers are of advanced design, electrically correct and efficiently built; housed in cabinets of true artistic excellence. They reproduce music both from radio broadcasting and from phonograph records, enabling the listener to have entertainment anywhere at any time. Complete electrification of the receivers is peculiarly appropriate to a product bearing the name of Edison, the father of the electrical industry.

Campbell Soup Company

The Campbell Soup Company is of special interest as one of New Jersey's leading manufacturing establishments and also as an outlet for much of the State's agricultural produce. Organized in 1869 as a canning and preserving establishment, the Campbell plant at one time produced 200 different articles, but more recently has specialized in canned soups, beans, and spaghetti.

Campbell was the first to introduce condensed soups in America. From the very beginning, one of the problems was to educate the American people to the advantages of soup as a regular diet, since soup did not occupy an important place in the American menu.

The Campbell plant, which embraces 19 acres of floor space, has been at Camden since its origin, although a new plant is now being built in Chicago. Over 30,000 carloads of ingredients, containers, and finished products move in and out of this plant in a year.

The production of soup began in 1898 and has been constantly increasing, until now there is an output of 500,000 cans every hour during the busy season, or an amount equal to that placed on the market during the first year.

Agricultural laboratories and farms are maintained at convenient points in New Jersey for the development and propagation of choice varieties of tomatoes, celery, asparagus, and other garden vegetables. One year's pack of

STERILIZING RETORTS ROOM, CAMPBELL KITCHENS—CAMDEN

tomato soup requires 50,000 acres in tomatoes alone.

The tomatoes are "handled" without hands, are turned into running water, and go through several washings of hot and cold water. Imperfect specimens are removed, and the perfect fruit is carried by a chain of porcelain-lined conveyors to the cooking caldrons of solid nickel. Skin, seeds, and core fiber are removed by electrically driven colanders, leaving only the pure juice. The soup then goes to stations where sanitary cans are filled, closed, and hermetically sealed, after which they are sterilized by superheated steam.

The products of Campbell's are quite varied. There are 21 kinds of soups manufactured, including vegetable purees, meat soups, and clear soups, besides beans and spaghetti. The Franco-American Food Company is operated as a subdivision, producing 14 different soups and canned spaghetti.

Johnson & Johnson

The Johnson & Johnson business was founded in 1886. Robert W. Johnson and James W. Johnson had both been pioneers in the manufacture of pharmaceutical plasters with an India-rubber base. They had developed improvements in the making of plaster mass and the spreading of plasters which they believed would make these things more effective as therapeutic agents. To make surgical dressings, first-aid products, dental supplies and toilet specialties, the parent company at New Brunswick occupies a group of 51 buildings, with 22 acres of floor space.

The Johnsons had been studying the important changes taking place in the medical and surgical world. Pasteur had overthrown the doctrine of spontaneous generation. The science of bacteriology had had its birth. Then Lister attributed the mischief in wound repair to "living atmospheric particles," septic germs, which he attempted to destroy with carbolic acid.

Johnson & Johnson applied themselves to producing dressings that fulfilled the demand of the best surgical practice under the new Listerian system. These dressings were packed so that they could be distributed to the profes-

sion through the drug trade without danger of deterioration by handling or climatic changes.

When antisepsis came in, wounds were dressed with tow, oakum, jute, or cotton wadding, wet with carbolic acid. Absorbent cotton was supplied for surgical uses in the form of wads or in inconvenient shapes until Johnson & Johnson devised the method of rolling the cotton into sheets, with tissue paper between the layers.

From the beginning this company realized that their success depended upon the confidence of the medical profession and that careful laboratory supervision of manufacturing processes was necessary. The research laboratory of the concern is constantly at work upon problems of interest to the medical and surgical professions. While intended for the development of the interests of Johnson & Johnson, the laboratory has been conducted in a scientific spirit and its results have always been made available to the medical profession.

Since it is absolutely essential that pure water be used in washing gauze and cotton, which are themselves filtering materials, a water filtration plant, with a capacity of 300,000 gallons a day has been installed to supply the water needed in the Johnson & Johnson industry. Constant tests show that the water is always much above the standard requirements.

This company has kept pace with the progress in the art of surgery, producing a suitable dressing for every new method introduced to the medical profession. Among their successes has been the production of surgically clean catgut and sterilized animal membranes. The concern was a pioneer in the first-aid system. Besides surgical dressings it makes such toilet articles as baby powder, liquid soap, and packaged dental floss.

Colgate & Company

Colgate & Co. is one of the few institutions in America which has been in the active control of its founder or his direct descendants for over a century. Founded by William Colgate in 1806 the company is directed by four of his grandsons and one great-grandson.

Although the first workshop was in New

BROTH KETTLES, CAMPBELL SOUP COMPANY—CAMDEN

COLGATE'S SOAP AND PERFUME FACTORIES—JERSEY CITY

York City, Colgate's is essentially a New Jersey enterprise. The factory was moved to Jersey City in 1847 and has grown until it takes in seven city squares. Twenty-five giant pans for boiling soap are in constant use, ten having a capacity of 700,000 pounds and one of almost 1,000,000 pounds. Yet in 1845 people traveled miles to gaze in wonder at "Colgate's Folly," a pan which in one batch held 45,000 pounds.

The products of Colgate embrace soaps, glycerines, perfumes, and toilet articles. Most of the soaps are manufactured by the "settled soap" process, which either eliminates impurities or cuts them to a minimum. The fats or oils are boiled with strong caustic soda lye which saponifies the oil, producing glycerine as a by-product and removing chance impurities. The glycerine is washed from the hot soap by a salt solution, which also removes the excess alkalies. The soap is again boiled and treated with water until it assumes the condition of two balanced solutions, the heavier containing some soap and impurities not removed before, while the upper layer, known as settled soap, is the pure product, which is then pumped to other parts of the factory to be worked into salable shapes.

Different soap products are secured by using certain fats and oils as bases. For toilet soaps, cocoanut, palm, olive oil, or clean beef tallow are used, and later treated with perfume oils. Some potash is substituted for all soda in preparing shaving soaps with hard fat or stearine used as a base. Soap powders and scouring cleansers are made from combinations of soap and sal soda and soap, soda, and volcanic ash respectively. Several dry soaps are sold in flaked form. Floating soaps are made by beating up with air a pure soap with a large percentage of cocoanut oil until it contains enough bubbles to make it lighter than water.

The residue left in the settling process is boiled with oil, which absorbs the alkali, and the resulting solution is neutralized and clarified and finally distilled, leaving chemically pure glycerine.

Perfumes in most cases are manufactured directly from the plants, using the flowers, the leaves, or in some cases the entire plant. This is done by steam distillation or by extraction with refined petroleums. In some cases the exact chemical structure of the perfume material has been determined, so that synthetic perfumes can be produced. These perfume materials

are combined with alcohol to secure extracts and toilet waters, the toilet waters containing a smaller proportion of perfume materials than the extracts.

Many toilet articles are also manufactured, of which the most important are dental cream and powder, talcum, face, and baby powders, cold cream, and vanishing cream.

Babcock and Wilcox Company

In 1867 George H. Babcock and Stephen Wilcox started a partnership for the manufacture of high-pressure water-tube boilers, this being succeeded in 1881 by the Babcock & Wilcox Company. This company has extensive plants in New Jersey and Ohio, and its associated company, Babcock & Wilcox Ltd., has plants in Scotland, England, Australia, and Japan.

The New Jersey works, which were formerly at Elizabethport, but which in 1901 were moved to Bayonne, cover 46 acres, with a floor space of 800,000 square feet.

Early attempts to utilize water-tube boilers were few, the first one being built by Blakey in 1766. There followed several improvements to this type until Stephen Wilcox, in 1856, constructed the first water-tube boiler, using inclined water tubes connecting water spaces at the front and rear with a steam space above. Finally George Babcock and Stephen Wilcox made commercially successful the utilization of water tubes in steam generators.

The Babcock & Wilcox boiler is built in two general classes, the longitudinal drum type and the cross-drum type. While the latter was designed to meet conditions of head room, it has become popular in numerous classes of work where head room is not a factor, and is particularly adaptable for large units. Either type may be constructed with vertical headers, or with inclined headers perpendicular to the tubes, and the headers may be either of wrought steel or of cast iron.

In addition to manufacturing these two classes of boilers, Babcock & Wilcox produce several devices to use in conjunction with them, such as their chain-grate stokers, super-

ROLLING AND PACKING COTTON AND GAUZE AT THE JOHNSON & JOHNSON PLANT IN NEW BRUNSWICK

HEADER MACHINE SHOP, BABCOCK & WILCOX CO.—BAYONNE

DRUM SHOP, BABCOCK & WILCOX CO.—BAYONNE

heaters, economizers, mechanical atomizer burners, and steam atomizer burners.

These boilers are installed in the largest buildings, power plants, and factories in the country. The Woolworth Building operates 2,454 horsepower of Babcock & Wilcox boilers; the Essex station of the Public Service Electric Company of New Jersey operates 36,080 horsepower of these boilers, and the Bethlehem Steel Company 46,000 horsepower.

Nor are the boilers confined to land use. In fact, the Babcock & Wilcox cross-drum type was widely adopted for marine service before it had any considerable use on land. One of the Navy ships equipped with these boilers is the "Tennessee," whose power plant has a capacity of 13, 925 horsepower.

John A. Roebling's Sons Company

The products of the Roebling wire plants in and around Trenton include steel, copper, galvanized, copper-coated, insulated, flat and round wire, twisted wire ropes, cables of numerous strands of hundreds of wires laid side by side and bound into cylindrical form, hemp-cored rope, steel-cored rope, round ropes, flat ropes, and spools of wire thousands of feet long. In fact, every kind of wire is made, from that having a diameter of one four-thousandth of an inch to cables three inches thick.

The establishment founded in 1845 by John A. Roebling has grown until it embraces three plants. The main one is in Trenton and covers about 35 acres; the Buckthorn factory is half a mile farther south; the Kinkora plant is ten miles down the Delaware River and embraces the company's own town of Roebling.

There are a hundred buildings in the three plants, four electric power stations with 16,000 horsepower, and 150 boilers with 25,000 horsepower. About 1000 tons of coal is consumed a day and 20,000,000 gallons of fuel oil a year. The Kinkora plant has 13 miles of standard-gage railroad track. Just before the war 8,000 employees were manufacturing Roebling products and the value of the output ran far into the millions.

In former years the Roebling company engaged in construction work as well as in the production of wire, but has now discontinued that activity. John Roebling was first to realize the utility of steel wire in constructing suspension bridges, and it was he who planned the Brooklyn Bridge. Roebling also furnished the wire and installed the cable for the Williamsburg Bridge and supplied the cable for the Manhattan Bridge, which latter called for 12,000,000 pounds of wire.

The company produces its own steel at the Kinkora plant. The steel ingots are rolled down, cut and re-rolled until they appear as rods of the desired size. The rods are then pulled through a steel die and wound off in miles of wire. This process is repeated, using dies of diminishing size until the desired diameter of wire is obtained. For very fine wire it is necessary to use diamond dies, since the threadlike wire cuts the steel dies.

The town of Roebling, ten miles south of Trenton, is a model of its kind. It has its own store which sells below current prices, its own supply of electric light and coal, its own fire and police companies, and its own bank. The residences for the most part are of brick, and there are a baseball ground, a recreation building, a theater, public school, hospital and dispensary, so that all the needs of the Roebling employees can be met within their own town.

Botany Worsted Mills

In 1889 the first unit of the Botany Worsted Mills was established at Passaic by the late Eduard Stoehr. The first industrial principle controlling the enterprise was that the company should be a vertical organization taking the raw fleece and creating a finished fabric. Up to that time many of the processes of the wool textile industry had been conducted by separate organizations, such as weavers and dyers. The second thought behind the establishment of the mill was that of bringing to the United States the most advanced European technique, which up to that time had not penetrated the American industry.

Eduard Stoehr had previously created the great worsted and woolen mills at Leipzig, Germany, known as Kammgarnspinnerei Stoehr & Company, and was recognized as one of the leading European authorities of the industry. Associated with him were Louis Hirsch, who

conducted one of the largest dyeing and finishing establishments on the Continent, and Friedrich Arnold, one of the largest dress goods manufacturers in Europe. Mr. Stoehr was himself a spinner, so that the expert knowledge of these three men covered the essential processes in wool-cloth manufacturing.

The American enterprise benefited under the McKinley protective tariff so that it was able to cope with European competition, putting the American industry in a position to compete with the best foreign products. The selection of Passaic as the site for the first mill was due to the chemical properties of the local water.

There are between 3,000 and 4,000 looms operated by Botany Consolidated Mills which are supported by combing, dyeing, finishing and other machinery in proportion. Approximately 4000 workers produce a wide range of goods.

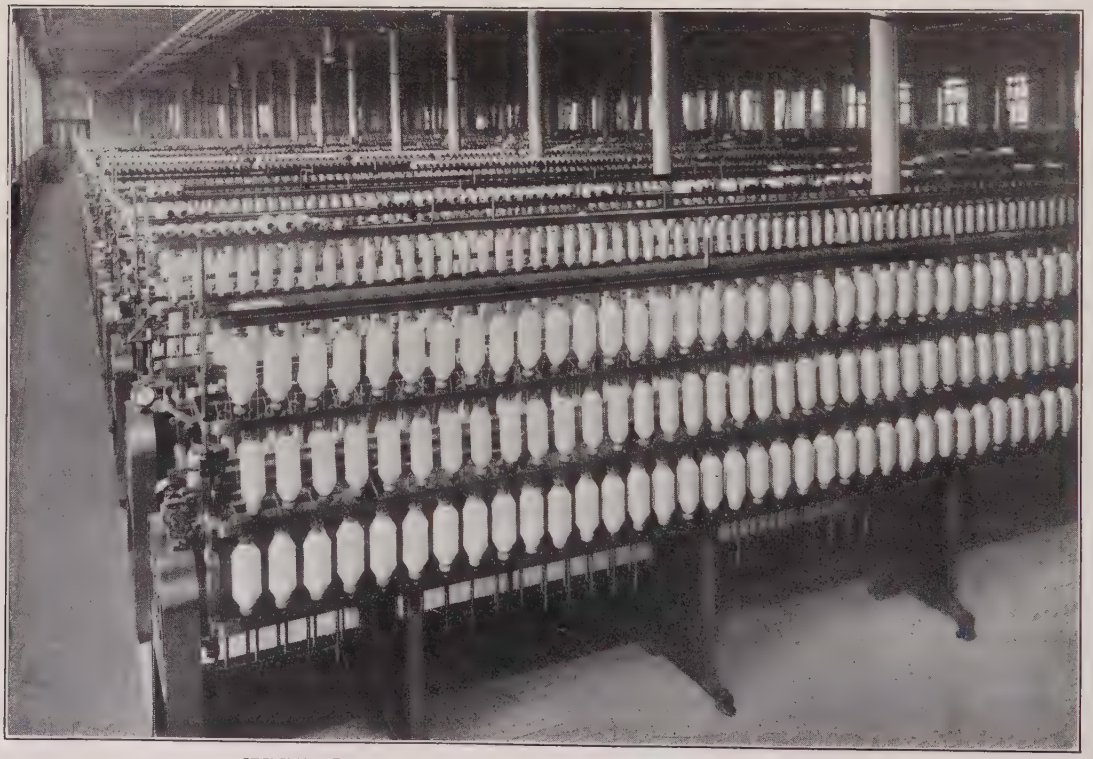
The mills have withdrawn from their large European investments, but retain certain equities which afford the American organization a close contact with technical developments in Europe.

Clark Thread Co.

The original plant of the Clark Thread Company was opened in Newark in 1868, at which time it occupied 50,000 square feet of floor space. Today it is the largest thread mill in the United States and one of the three largest in the world, occupying a floor area of over 40 acres and having a capacity of 99,205 miles daily of the various types of thread produced, or enough to encircle the earth at the equator about four times.

Five thousand people operate over 500,000 spinning and twisting spindles and other machinery used in the manufacture of thread. In order that every employee may thoroughly know his or her job, training schools for new employees have been established, supervised by a staff of instructors some of whom have been in the employ of the company for over 50 years.

A five-cent spool of thread is such an insignificant article that few people realize the care and time that go into its manufacture. The cotton is received in compressed bales and is opened and loosened up by a bale-breaking



SPINNING ROOM, CLARK THREAD COMPANY—NEWARK

machine, following which it is beaten up until it becomes soft and fluffy. Then it is made into large laps. These beating machines are called pickers or scutchers, and they remove the heavier foreign matter. The cotton as it comes from the scutchers is in continuous laps much like sheets of batting.

The carding machines receive the cotton next. Fibers and bits of dirt have no chance when the cotton is being rolled over a cylinder covered with fine wire teeth, 90,000 to a square foot. Brushed and combed both ways, the almost parallel fibers flow out like a white mist.

This gossamer is streamed into a thick rope which submits to a combing that sorts out and discards the fibers that do not come up to standard length. Leaving the combers, the slivers or strands are drawn out to the dimensions required, passing through five processes before coming to the "mule," or spinning frame.

This machine does the work of our great-grandmother's spinning wheel. A thousand spindles on a frame advance and retreat in a mechanical minuet. Eight thousand revolutions a minute trick the eye into thinking that the spindles are motionless, but with every twirl the yarn stretches more.

Thread is the doubling and twisting of yarn: First of all two ends of yarn are twisted together, and then three of these are twisted together into a six-cord. The thread is still unfinished because it has the natural gray appearance of cotton. Before it is good enough for sewing purposes it must be boiled out and bleached or dyed. When this has been completed it emerges snow-white, black, or one of the many fashionable shades into which it is dyed.

If the thread is to be so softly shining that it will conceal its own stitches when used to sew on silk it must have a mercerizing treatment. When it emerges from this, it will have a delicate soft sheen and may be literally hidden in a garment, because unlike silk, cotton thread can be sewed with a tight tension and thus buried in the fabric and protected by it.

After bleaching, or dyeing, the thread is wound on a spool, the end snipped and tucked in and the spool is given Clark's O.N.T. label. Over 25 machines have been employed in changing raw fluffs of cotton into a perfect sewing thread.

Trenton Potteries Company

In 1892 five prominent and successful potteries were brought under one management and the corporation took the name of the Trenton Potteries Company. These potteries were known as the Crescent, Delaware, Empire, Enterprise, and Equitable. In this merger the skilled employees, the formulas, and the managements became assets of one concern. This combination afforded greater economies of manufacture through bulk production and the coordinate efforts of so many expert potters.

Very soon this company began experimenting in the manufacture of solid porcelain, which at that time was being imported in large quantities. In time the efforts proved successful, and a new plant was built for the manufacture of this product. This was known as the Ideal pottery and was the first in this country successfully to produce porcelain bathtubs.

At the time of the consolidation four of these plants were making vitreous china and the other one manufactured tableware. At present all the potteries are manufacturing Tepeco all-clay plumbing fixtures for bathroom and kitchen.

Raw materials are brought from all over the country and from across the seas. The articles are shaped by both hand molds and by mechanical casts. Firing is done in both the vertical kiln and the tunnel kilns, although the tunnels are gradually replacing the older type.

Wright Aeronautical Corporation

Most of the concerns mentioned have been old-established New Jersey industries, but since the war there has sprung up a business of increasing importance and which is the leader of its kind in the country, the Wright Aeronautical Corporation of Paterson, formed in 1919. At that time the assets and business of the Wright-Martin Aircraft Corporation were taken over, so that in this way were inherited the patent rights, tradition, and the name of the Wright brothers, the fathers of

mechanical flying, who made their first flight in 1903.

Several years later there was acquired by purchase and merger the business of the Lawrence Aero Engine Corporation, which had developed a very successful air-cooled engine of 200 horsepower. Water-cooled engines previously had been used, but with the introduction of the lighter air-cooled engine, which was more adaptable to variations in altitude and climate conditions, there could be built a lighter and more compact plane, easier to maintain and overhaul.

The Wright Company concentrates upon production of its "Whirlwind" and "Cyclone" airplane engines and the "Typhoon" marine engine. The Wright Whirlwind engine, used in the planes of Lindbergh, Byrd, Chamberlain, and other record-holding flyers, develops over 200 horsepower and weighs about 500 pounds, or about 2½ pounds per horsepower, as contrasted with the original Wright engine used by the Wright brothers which developed 12 horsepower and weighed 250 pounds, or 22 pounds per horsepower. The engines are built like scientific instruments by only highly skilled workers, with constant testing of material, frequent measurements such as calibration and micrometering of parts to detect the slightest variation from standard, and the immediate scrapping of anything below standard.

The Whirlwind engine is of the fixed radial type, consisting of nine cylinders arranged around a central crankcase and crankshaft encircled by a master connecting rod to which are joined the other eight connecting rods. There are two separate and complete ignition systems, each cylinder having two spark plugs fired simultaneously by separate magnetos, so that if one plug or even one ignition system fails, the other will explode the gasoline.

The Cyclone engine is similar in design to the "Whirlwind," but is much larger and develops as high as 550 horsepower. At present it is being built solely for the United States government, but later will probably be released for commercial sale.

AMERICAN BROWN-BOVERI ELECTRIC CORPORATION AND NEW YORK SHIPBUILDING COMPANY PLANTS AT CAMDEN

There was a sudden increase in the demand for aircraft engines in 1927, so that the number of men on the payroll was greatly increased. New equipment was rapidly built and contracts were awarded for the construction of new buildings adjacent to the present plant at Paterson.

E. I. du Pont de Nemours & Company

The history of the du Pont Company is a tribute to the utility of commercial chemical research. Originally founded as a black powder factory in 1802 by Irenee du Pont, who was encouraged in this venture by his friend, President Jefferson, this establishment has gradually extended its scope, manufacturing today such diverse products as gunpowder, imitation ivory toilet-ware, dynamite and Duco, the latter for finishing cars. All of these are made by closely related chemical processes, but there is a great variance to the products.

Six plants are maintained in New Jersey. One at Arlington employs over 2,000 people and specializes in pyralin plastic products; one at Carney's Point has 2,000 workers engaged in the manufacture of gunpowder; the Parlin plant, employing nearly 1,000, is in the pyroxylin business; the Repauno dynamite plant has 800 workers, while the Pompton Lakes powder cap works and the Newark paint and color works each employs about 500.

The Repauno plant, which is the largest dynamite factory in the world, produced in 1926 in a single month 7,000,000 pounds of dynamite, as much as was used by the whole world in the year that this plant was founded. A research problem successfully solved in 1925 was to perfect a dynamite that would not freeze at any climatic temperature.

The Parlin and Arlington plants making pyroxylin utilize much of the same raw materials, plant equipment, manufacturing processes, and technical knowledge as are required in the production of smokeless powder. Pyroxylin is used in making Fabrikoid or imitation leather, as a protective film for metal objects and gas mantles, as a waterproof cement for leather belting, as a carrier for bronze powder, and in a solution of low viscosity as the automobile finish known as Duco.

From pyroxylin plaster (a mixture of camphor, alcohol, and nitrocellulose), are created imitations of amber, glass, stone, wood, rubber, horn, shells, pearl, ivory, and semi-precious stones.

American Brown Boveri Electric Corporation

Probably the largest and most comprehensive unit in America's ship-building strength is the American Brown Boveri Electric Corporation at Camden. It has built over 20 per cent of the vessel tonnage now comprising the United States Navy. The company for two years has been perfecting its organization to design and manufacture utility, railway, and industrial electrification equipment.

The plant has 191 acres of land, with 4,272 feet of waterfront on the Delaware River, and 12 miles of standard gage tracks and sidings. At the north end of the property, back from the waterfront, are the shops and power plant devoted to shipbuilding activities. These shops are equipped with labor-saving machinery and have a floor area of 468,000 square feet. A crane system serves the buildings and yard.

The shipway capacity comprises five covered double-ways from 126 to 140 feet wide, two ways each 152 feet wide, and four ways each 103 feet wide. The ten smaller shipways used for destroyers and other craft during the World War could be again put in commission. Thus there is a shipway capacity for 28 vessels of ordinary size in addition to ships that can be outfitted in the basins. With the exception of the Government plant at Hog Island, the shipway capacity of the American Brown Boveri Electric Corporation is the largest in this country or abroad. This plant has been building ships for 26 years. At the beginning of 1917 there were 4,500 men employed in the yard. In 1919 there were 17,500. Now there are 7,500.

Since the yard was built, the company has delivered 371 vessels, of which 52 were warships and 319 merchant ships. The total output is 1,250,000 gross tons, and the plants installed have 2,000,000 horsepower.

BAKING, TRENTON POTTERIES COMPANY—TRENTON

MOULDING AT THE TRENTON POTTERIES WORKS

INSPECTION AND TESTING, TRENTON POTTERIES COMPANY

CONTINUOUS OVENS, TRENTON POTTERIES CO.—TRENTON

Mack-International Motor-Truck Corporation

When the internal combustion engine was slowly developing from an experiment into a practical power plant, the Mack Brothers in 1900 applied it to American commercial highway transportation.

For some time prior to the production of the first Mack, Adolph Saurer, of Arbon, Switzerland, had been making motor-trucks in Europe. The Saurer is still being manufactured in Switzerland, France, Germany, and Austria through its founder.

Shortly after the Mack had established itself in the American field, the Hewitt Motor Company was founded by E. R. Hewitt, an engineer of international fame. The first Hewitt light truck was delivered in 1901 and the first five-ton Hewitt was sold in 1905, followed by the ten-ton Hewitt.

By combining the main features of these three trucks, the modern Mack was evolved. The company now building Mack trucks and buses was incorporated as the International Motor Company in October, 1911. It acquired the resources, patents, and personnel of these three American pioneer motor-truck and bus manufacturers, and more than one-third of the employees at the time of the consolidation are with the present Mack company.

The Mack is an engineered product, manufactured in three great factories at Allentown, Pa., Plainfield and New Brunswick, N. J., with direct factory branches at central points.

R. D. Wood & Co.

R. D. Wood & Co. celebrated in 1928 its 125th anniversary of activity in New Jersey. In 1803 the founder constructed a blast furnace at Millville, where in addition to the metal there were cast stove plates, fences, lamp posts, and iron water pipe, the first to be cast in America. Since that time there have been constant improvements. A number of new plants were built and in turn abandoned or sold, so that at present the company retains and operates only its Florence works.

The original plant used the oldest method of casting water pipes in sand molds in a horizontal position, but the Florence works has been equipped to employ the newest process called the "sand spun" process, by which the pipes are cast centrifugally in refractory molds.

The Florence plant on the Delaware River at tidewater covers 54 acres and employs 1,500 men. In contrast to the products of the earlier foundry, it now produces fire hydrants, gate valves, hydraulic machinery, gas machinery, gas producers, and numerous other such products.

Among the most prominent machines built by this company are the original iron pumps and turbines used by the City of Philadelphia for lifting water into Fairmount Reservoir, the centrifugal pumps used in supplying new filter beds for the City of Philadelphia, and one of the largest single units for steam pumping machinery in the United States which is in operation in the City of Cincinnati. Thousands of tons of materials have been shipped to the Pacific Coast for construction of water and gas works. This shipment was carried on before the construction of the Panama Canal, when because of the bad weather encountered around the Horn, cargoes were frequently either jettisoned or completely lost.

Ingersoll-Rand Company

The Ingersoll-Rand Company's shops at Phillipsburg have been in full swing since 1904 and represent the most conspicuous feature of Phillipsburg industrial life. This plant is the largest of five plants operated by the company, which has played an outstanding part in the development of rock drills, pneumatic tools, and air compressors, over a period of more than half a century.

The products turned out at Phillipsburg in their making call for the services of hundreds of skilled workers. The plant manufactures rock drills for mines and quarries, air compressors of the larger types, turbo-blowers, condensers, and heavy oil engines for manifold purposes. The shops are equipped with machine tools of superior sorts and in numerous instances of an automatic nature particularly built for the exacting work required of them.

The Phillipsburg plant was called into being to provide a spacious and an especially health-

ful industrial center. It is situated near the confluence of the Lehigh and the Delaware Rivers. There is ample room for expansion, and within the reservation is the plant of the A. S. Cameron Steam Pump Works, an affiliated company that manufactures various types of pumps.

Michelin Tire Company

The Michelin Tire Company, claiming to be the oldest rubber manufacturing concern in the world, is an outgrowth of a rubber-ball factory founded in France in the year 1832. This company has plants in France, Italy, England, and Milltown, N. J., for the sole manufacture of rubber tires.

In 1888 the business, which had gradually declined, was taken over by two grandsons of one of the founders. At that time bicycles were just coming into popularity, and as the tires were not detachable the frequent punctures were serious. Michelin brought out the first detachable tire fixed to the rim by 17 bolts and requiring 15 minutes to change. Improvements soon made it possible to change a tire in two minutes, so that the Michelins organized a race and secretly strewed the route with nails, with the result that the 244 punctures occurring were no trouble to repair.

When the automobile was introduced, solid tires were used with such resultant vibration that the cars proved almost useless. In 1895 Michelin prepared a pneumatic tire, but failed to find anyone who would use it in a coming race. Consequently they entered a car of their own called "Lightning," not because of its speed, but because of its zigzag course, and although it had a puncture every 90 miles and caught fire twice, it arrived at the finish triumphantly introducing pneumatic automobile tires to the world.

Michelin claims to be the first to invent the pneumatic auto tire, the ring-shaped tube, the demountable rim, the successful non-skid, the steel disk auto wheel, and the balloon tire for existing rims. At their plant in Milltown, Michelins own and rent 240 houses and sell homes on the easy-payment plan to their employees. There is maintained a community house for the use of the 1,800 workers with an auditorium, poolroom, bowling alleys, and cafeteria.

United States Metals Refining Company

The smelting and refining plant of the United States Metals Refining Company at Carteret is reached by water through Staten Island Sound to its docks and also by rail.

It started operations in 1902 and was for a number of years known as the DeLamar Refining Works. Its main operations consist of smelting copper ores, concentrates, mattes, slags, and secondaries, and of refining electrolytically blister copper from its own smelter and from others in the United States, South America, and other parts of the globe.

In 1902 this plant produced 8,000 tons of electrolytic copper, and since then its production has increased steadily until in 1927 it amounted to approximately 240,000 tons, thus establishing it as one of the world's largest producers of refined copper. The copper is turned out in such commercial forms as wire bars, ingots, cakes, cathodes, and billets.

In addition to copper, quantities of silver, gold, platinum, palladium, and selenium are produced.

The metallurgical and mechanical equipment in the works is of the latest design, and it is constantly being enlarged and improved to reduce costs and keep pace with the growing demand for high-grade products.

The plant is divided into the three departments of smelter, refinery, and scrap-metal plant. The smelting plant, the largest in the United States east of the Mississippi River, has a large storage building, two sampling mills, roasters, a Dwight-Lloyd sintering machine, and in the main building one large reverberatory furnace which makes copper matte from ores and concentrates. This matte goes to converters which blow the matte to blister copper. There are also blast furnaces which run on metallics to produce black copper.

The yard department handles all incoming and outgoing materials. There is a sampling room where the incoming copper is tested by drilling.

The casting department makes anodes for the electrolytic department from blister and scrap copper, and melts and casts cathode copper into commercial shapes. There are eight large reverberatory furnaces, four for anodes and four for wire bars and other refined shapes.

The electrolytic department, or tank house, refines the impure copper anodes by electrolysis, making pure copper cathodes, which are sent to the casting department. The impurities in the form of slimes containing the gold, silver, platinum, and palladium fall to the bottom of the tanks, whence they are sent to the silver refinery. Here the precious metals are refined electrolytically. Gold and silver are turned out in bars and shot, while platinum and palladium are produced in powdered form. Selenium is recovered as a by-product.

The plant has 1800 employees. In 1927 the company acquired under lease the plant of The Balbach Metals Corporation. This plant is equipped to treat lead ores, bullion, mattes, and other lead-bearing materials. It also treats jewelry sweeps and bullion.

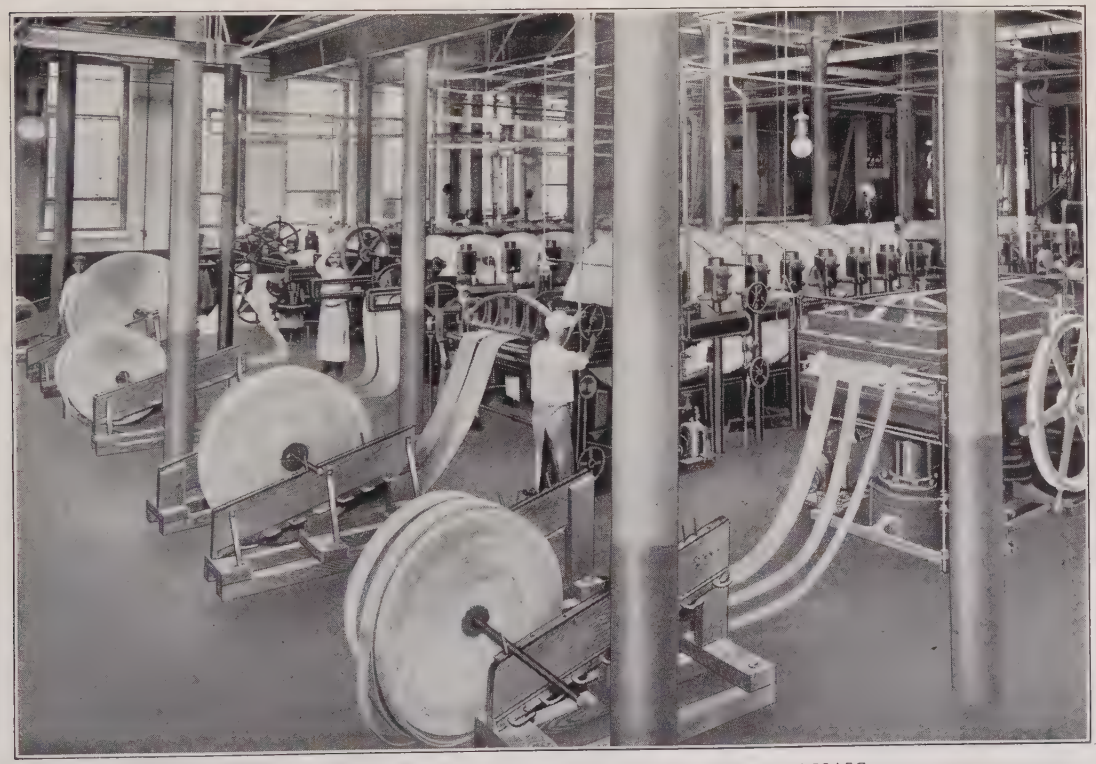
Johns-Manville Corporation

The largest manufacturer of asbestos products in the world is the Johns-Manville Corporation, with a factory at Manville, about four miles west of Bound Brook. It covers an area of 325 acres, the buildings occupying 25 acres. They are 150 feet wide and approximately 1000 feet long, well lighted and ventilated, with concrete flooring throughout. Five miles of concrete roads surround the plant.

The products consist of asbestos textiles, packings, pipe and boiler insulations, insulating and refractory cements, roofings, shingles, ebony wood, power specialties, and railroad supplies.

There are over seven miles of railroad sidings. The power plant develops 10,000 horsepower. The employees number about 1500. Fully 14,000 carloads are handled at the plant annually.

The company owns asbestos mines in Canada and Arizona, and has six other factories in various parts of the country.



NEW YORK BELTING & PACKING CO. WORKS AT PASSAIC

Grasselli Chemical Company

Grasselli Chemical Company was founded at Cincinnati in 1839 by Eugene Grasselli, who erected there the first sulphuric-acid plant built west of the Allegheny Mountains. As the demand justified, other chemicals were manufactured. In 1866 the company built a plant at Cleveland and transferred its headquarters to that city.

In 1844 the corporation bought the site of the original plant at Grasselli, N. J., and this has been extended until it covers 150 acres and employs 1500 men. The 25 products made at this plant include sulphuric, muriatic, nitric, and battery acids, lithophone, glauber salt, silicate of soda, phosphate of soda and trisodium phosphate.

The company has 25 operations in the United States, of which the Grasselli plant is one of the largest. It also operates 17 delivery warehouses to facilitate deliveries to customers. The chemicals produced at the Grasselli works are used by over 100 different classes of industry.

New York Belting & Packing Company

The modern plant of the New York Belting & Packing Company in Passaic is engaged in the manufacture of rubber goods for mechanical purposes. The products are belting for power transmission; rubber hose for use with water, steam, and air; sheet and piston packings; molded goods in a great variety; and grinding wheels banded with rubber, and rubber-tiled flooring.

The company dates back to the time of the discovery by Charles Goodyear of the process of vulcanizing rubber. Organized in 1846, it has had 82 years of successful business life. Its plant is modern, and many of the buildings are new and equipped with efficient machinery for producing goods of uniform quality in large volume.

There is an industrial and chemical laboratory for testing materials and for carrying on research work in the development of new goods and new processes. The number of employees averages 1800.

Weston Electrical Instrument Company

Dr. Edward Weston, after having performed extensive research with the Weston Dynamo Electric Machine Company for several years prior to 1886, established his own research laboratories in Newark known as the Weston Electrical Instrument Company.

This company has grown from a small laboratory to a factory covering many acres and employing over 1,000 people. It manufactures instruments for the measurement of direct and alternating currents, the Weston standard cell which is the international standard of electromotive force, and such adaptations of electrical measurement as the electric tachometer, which is a device for the measurement of rotary speeds, indicating the movement at the point of installation, or transmitting the measurement by cable to managerial offices.

These instruments have been one of the necessary guiding influences in the advancement of the use of electricity. Without them neither the generators supplying power nor the networks of transmission and distributing lines could be controlled. They also add to the effectiveness of research work in laboratories.

Miraculously delicate and accurate operations are necessary in the manufacture of these instruments. For example, the trussed frames of some of the pointers are made of extremely small aluminum tubing having a wall less than one one-thousandth of an inch in thickness, yet giving essential lightness and strength. Exact balance of the pointer is obtained by three minute nuts screwed on to aluminum cross-arms carrying a pitch of 500 threads to an inch. Each instrument during the process of manufacture and assembly is on the average subjected to 140 careful inspections.

Westinghouse Electric & Manufacturing Company

The plant of the Westinghouse Electric & Manufacturing Company at Newark, where more than 4,000 people are employed, is engaged in the manufacture of watt-hour meters, electric instruments, arc and voltage regulators, relays, and radio loud speakers. The factory

contains the latest equipment, including domestic and foreign machine tools, modern facilities for measuring and conveying equipment, and a large number of labor-saving devices. The first building at the present site was erected in 1904, and there are now eight buildings which contain 300,000 square feet of manufacturing and office floor space.

More than 30 carloads of equipment valued at nearly $1,000,000 are shipped from the plant monthly. Electric power is used almost entirely in operating the devices in the different shops, and for this purpose the Newark works uses about 3,800,000 kilowatt-hours of power yearly.

The Westinghouse Lamp Company, a subsidiary, has had a plant at Bloomfield for 20 years, with 2,500 people now employed. The 11 acres of land are occupied by 11 buildings, with a net floor space of 658,000 square feet, for the manufacture of Tungsten filament Mazda lamps, radio-receiving and transmitting tubes, rectigons, and high- and low-tension rectifiers.

In addition to the Bloomfield works, the company operates plants in Trenton, making about 27,000,000 standard lamps yearly; in Belleville, making about 100,000,000 bases yearly for lamps and radio tubes; in Brooklyn, N. Y., making about 26,000,000 miniature lamps yearly; and in Milwaukee, Wis., where about 27,000,000 standard lamps are produced annually.

Manhattan Rubber Manufacturing Co.

The Manhattan Rubber Manufacturing Company, with offices and factories at Passaic, was organized in 1893 to manufacture mechanical rubber goods. The growth has been steady and consistent. Beginning with one building, it now covers four large blocks with an auxiliary reclaiming plant at Whippany. It is the largest independent manufacturer of rubber goods in the world.

In order to control the raw materials that go into their products, rubber plantations are operated and maintained in Java. The factories are located 12 miles from New York and operate a fleet of trucks which make daily deliveries to all steamship piers and railroad terminals.

Products range from small molded articles to conveyor belts that have in many instances weighed over 10 tons apiece. Among the products are belts, brake linings, hose, packing, tubing, gaskets, billiard cushions, mats, rubber-covered rolls, sundries, molded goods and mechanical rubber goods, including Condor belts and the Hycoe line of automotive products.

A large and amply equipped testing laboratory is devoted to the development and improvement of quality products.

United Piece Dye Works

The United Piece Dye Works, capitalized at $10,000,000, is a merger effected in 1903 of the two neighboring Lodi dyeing establishments of the Boettgers and the Blums. This company employs over 5,000 people. All of its plants but one are in New Jersey, and each specializes in some operation. The Lodi printing departments are devoted to all-silk fabrics, the Hawthorne to cotton and silk mixtures, the Weidmann plant at Paterson to piece dyeing, and the Van Houten Street plant of Paterson to skein dyeing.

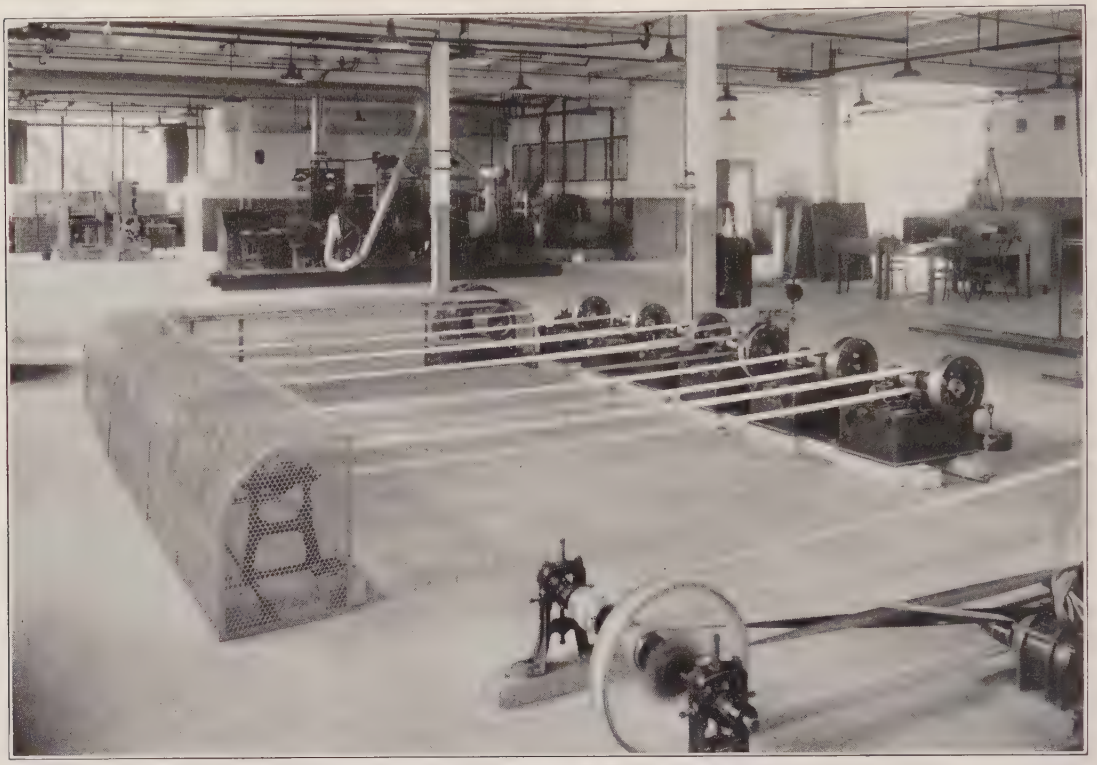
The Lodi establishment has two groups of buildings along the Saddle River, these being outgrowths of the original companies. Here are maintained a baby clinic and a hospital.

During the World War the scarcity of aniline dyes made it necessary to establish laboratories and a dye-producing plant. At the close of the war this business was sold to the du Pont company. Since 1908 the United Piece Dye Works has been in close relations with many large establishments of like character in Europe.

The Alexander Piece Dye Works, one of the original companies, claims to be the first to perform silk-piece dyeing in this country. The United Piece Dye Works claims to be the forerunner in the weighting of piece goods and in the commercial development of mastic printing, an adaptation of the ancient Oriental art of batik printing.

Keuffel & Esser Company

The Keuffel & Esser Company, with its general offices and factories at Hoboken, manu-



LABORATORY AND BELT TESTING APPARATUS
Manhattan Rubber Manufacturing Company works at Passaic

factures surveying instruments, drawing materials, blueprint paper, slice rules, drafting-room furniture, measuring tapes, periscopes, range finders, telescopes, gun sights, and hundreds of other products used by civil and mechanical engineers and draftsmen.

In 1867 Wilhelm Keuffel and Herman Esser founded this business, conducting it as importers and jobbers. The rapid growth induced them in 1870 to manufacture some of the goods sold by them, but the first factory was built in Hoboken in 1880. This was supplemented every few years by additions until the buildings now occupied have a floor area of 250,000 square feet with nearly 1,000 employees.

The mechanical equipment of the factories is of the highest type and includes special automatic precision machines for dividing circles and graduating slide rules. The workmen are highly skilled, and the variety of products requires services of those in 40 different trades.

The production of these instruments involves high technical skill as well as the most accurate mechanical devices, demanding in some cases measurements to one fifty-thousandth part of an inch.

Schwarzenbach Huber Company

Since the time of the Reformation the house of Schwarzenbach has been manufacturing silks. At that time this clan, which had settled about Lake Zurich in Switzerland, took advantage of the new industry introduced by the Huguenots fleeing from Locarno. Since 1829 this silk business has grown until now it maintains mills in Switzerland, France, Germany, Italy, and the United States.

The United States branch of the Schwarzenbach enterprises, known as the Schwarzenbach Huber Company, was started in New Jersey, where are still located four of its 15 American plants. The New Jersey plants are at Union City, Bayonne, Hackensack, and Union Hill. Other mills are in Pennsylvania, Connecticut, Virginia, and Alabama.

The first American plant was built in West

Hoboken in 1886 and has continued in active operation since, despite numerous ups and downs in the silk trade.

Since the early organization of this establishment, frequent replacement of machinery has been necessary because of the many improvements in textile machinery. Throwing machinery, which has undergone numerous changes, now combines the three operations of foretwisting, doubling, and twisting. Although the weaving looms are essentially the same in construction, it has been necessary to install wider looms because of the increased popularity of wider silks. Extreme changes have also been made in the quillers, warping, machinery, and bobbins.

The Schwarzenbach Huber Company makes its own cotton harness and reeds, assembles all its metal heddles, and does part of its own finishing and dyeing.

Singer Manufacturing Company

The Singer Manufacturing Company has one of its largest sewing machine plants in Elizabethport, where its factory employs 10,000 people. It is made up of 50 buildings, covering 84 acres. Within the property are nine miles of company-owned railroad tracks and over 2,000 feet of dock frontage. The factory walls cover 2,500,000 square feet of floor space. There are manufactured, 1,500 types of sewing machines, for every trade purpose from the stitching of filmy chiffon to the heaviest of leather belting, as well as the models of the familiar family machine. Research engineers are constantly experimenting to develop new and better machines.

This great plant is really several factories in one. It includes a very large iron foundry, extensive machine shops, a wood-finishing plant, a needle factory, and the electric motor plant, where the sewing machines are supplied with a motor and light.

In this factory the Singer Company in 1889 brought out the first electrically-powered sewing machine. Since that date, the electric machine has become increasingly popular as another labor-saving unit in the electrified home. The form of the family machine also has changed. The elaborately grilled iron supports of the old style treadle machine cabinet are giving way to a more advanced design. Compact portable electric models and library table cabinets, in keeping with modern furniture, today conceal unattractive parts while rendering all the more available this indispensable servant of the modern home.

All of this Singer production, however, does not leave the State. There are over 500,000 sewing machines of this make in use in New Jersey.

Edison Lamp Company

Half a century ago under the tired but eager eyes of a young man bent over a rude bench in a wooden building at Menlo Park, a small loop of wire prisoned in a glass bulb began to glow dimly. The men grouped about the bench held their breaths. They had been skeptical about that light and had made bets that it would last only a few minutes. Gradually the young inventor turned on more current until the loop of wire shone brilliantly and lighted up his face, a face that was already glowing with the exultant happiness of achievement. The skeptical men lost their bets, for the loop of wire burned steadily for nearly two days.

That young man was Thomas A. Edison, and the light was the first practical incandescent lamp. Today that lamp has many millions of descendants, and the man in whose brain it was conceived has the homage of the world.

From the humble beginning at Menlo Park has gradually grown up a giant industry. In 1880, a small factory was started about a half mile from the old laboratory, and lamps were manufactured on a larger scale than had before been possible. It was called the Edison Lamp Company.

During the next year the demand for lamps became so great that more space was needed, and factory buildings were purchased at Harrison, the present headquarters of the Edison Lamp works. This was later incorporated with the General Electric Company and is now known as the incandescent lamp department of the General Electric Company.

Some idea of the long road the incandescent lamp has traveled since 1879 may be gained when one learns that of the millions of lamps lighting up cities and towns and hamlets all over the world today, about 18 per cent are made by the 2,600 employees of the New Jersey plants of the General Electric Company.

General Electric Company

The Bloomfield works of the General Electric Company employs 1500 people. The products turned out by this works are entirely in the industrial control classification. Among them are rheostats, printing-press controls, building equipment controls, drum controllers, compensators, temperature relays, magnetic switches, solenoids and solenoid brakes.

The plant, which was originally operated by the Sprague Electric Company, has been one of the works of the General Electric Company for over 20 years. It has recently been enlarged, the present floor space being nearly 600,000 square feet.

Federal Shipbuilding and Dry Dock Company

The Federal Shipbuilding and Dry Dock Company, which is in Kearny on the west bank of the Hackensack River, was organized in 1917 for the construction of steel ocean-going vessels. It is one of the subsidiary companies of the United States Steel Corporation. The company constructed thirty 10,000-ton cargo vessels for the United States Shipping Board as part of the war program, and the quality of these vessels is evidenced by their popularity among present operators.

At the conclusion of the war the company continued operations, specializing in the construction of oil-carrying vessels as well as freight and passenger ships. Among its recent products are the freight and passenger liner "Dixie," which was put in service last January by the Southern Pacific Company, and the Gulf Refining Company's motor tanker, "Gulfpride," which is the largest merchant vessel ever built in the Port of New York. In

SEWING MACHINE ASSEMBLING DEPARTMENT
Singer Manufacturing Company—Elizabeth

addition to its shipbuilding activities the corporation operates an 8,000-ton floating drydock and engages in the repair of ocean-going ships as well as in the construction of barges, dredges, and harbor craft.

During the past few years it has devoted attention to converting vessels to Diesel drive, and its shops have been engaged in the construction of boilers, structural steel, machinery, and special equipment for the oil and chemical industries as well as marine work. One of its best-known standard products is a horizontal fire-tube waste-heat boiler popular in open-hearth installations.

The plant occupies 160 acres of land on the Lincoln Highway and Hackensack River and employs approximately 2,000 workers. The channel to the plant is 30 feet in depth. The area of its shops is approximately 14 acres, and its boiler, forge, machine shop, structural and other shops are equipped with modern machinery.

Ford Motors

The Kearny plant of the Ford Motor Company is one of 31 Ford assembly plants over the country, the Ford policy being to locate its plants in centers of population near railroad and shipping facilities. The areas in which the plants are situated benefit also, as the employment situation is made more stable by the practically incessant operations of these works. The men employed settle in the communities, becoming home owners and interested citizens.

The big Kearny establishment is chiefly an assembly plant. Parts are shipped to Kearny by freight from the Detroit headquarters of the Ford Company. From here they are consigned, by rail or ship, to distributing centers in the East.

Cars assembled at Kearny are for domestic distribution and also for foreign sale. Shipments are made to Europe and South America by Ford-owned boats. Where possible, however, the overseas demand is supplied by foreign assembly plants of the Ford Motor Company.

The highest figure for assembly of cars in a single day at the Kearny plant, which was opened in 1918, is 700. When full production of the model "A" is under way, the production here will probably reach 1,000 cars a day.

The buildings are on property occupying 90 acres. The floor area of the buildings is 1,000,000 square feet. The Ford power-house generates all the current required by the assembly plant.

Cleanliness is the motto of the organization. The place is kept immaculately clean by a sanitation force. Employees are not allowed to smoke within the plant. One of the basic Ford policies, that of manufacturing near the source of supply and assembling near the point of distribution, results in enormous savings in transportation costs. It also enables the company to maintain its manufacturing schedules with accuracy, thus avoiding a shortage on one hand and a surplus of materials on the other.

The cycle of Ford manufacture begins in the iron and coal mines, follows Ford-owned transportation routes, and includes the conversion and fabrication of the materials until the completed Ford products are placed in the hands of the customers.

Western Electric Company

The Western Electric Company, whose plant at Kearny is one of the most modern industrial establishments in the country, is the largest manufacturer of telephones and telephone equipment in the world. In this New Jersey plant and in its Hawthorne Works at Chicago the company manufactures the major portion of the requirements of telephone apparatus and cable for the Bell Telephone System and associated operating companies in the United States. It also acts as purchasing agent and maintains warehouses for all equipment and supplies for the system.

In addition, the company is the manufacturer or licensor of such important by-products outside the field of wire communication as radio broadcasting equipment, public address systems, electrical methods of recording sound, the Permalloy type of high-speed submarine telegraph cable, and equipment for the production of talking motion pictures.

About 60 years ago the company started as a general electrical business with a capital of $2,500. Its present name came into existence in 1881, since when the corporation has grown

MAIN AISLE OF MACHINE SHOP
DeLaval Steam Turbine Works at Trenton

until it has 40,000 employees and in 1927 reported sales amounting to $253,724,013. In addition to its Kearny and Hawthorne plants, it has distributing plants, repair shops, and warehouses in the principal cities of the United States.

For many years the Western Electric confined its manufacturing activities to its Hawthorne Works at Chicago. In 1922 it decided to construct a large plant in the East, and Kearny was selected as its site. Work was begun there in 1923, and these works have a floor area of 1,250,000 square feet.

J. L. Mott Company, Inc.

In 1828, when the nation was still in its infancy, the original Mott plant was started in Mott Haven, near New York City. After a few years it became apparent that the plant was too small to supply the demands, and enlargement followed enlargement, until in 1894 the potteries were established in Trenton, where in 1907 the manufacturing plant was concentrated.

Mott played a leading part in the development of sanitary plumbing equipment, and as the pioneer in that industry has contributed many inventions and improvements in this field. The Mott company was the first to make enameled iron ware, built-in bath tubs, quiet-acting closets, one-piece lavatories, built-in showers, tile enclosures with glass doors, and special hospital and marine plumbing goods.

The Mott industry, in addition to its brass, pottery and enameled-ware units at Trenton, comprising 22 acres of floor space, includes an extensive foundry and modernly equipped enameling plant at Louisville, Ky., where enameled-ware plumbing fixtures are manufactured.

The Mott organization began the second hundred years of its service under the firm name of J. L. Mott Company, Inc. Many improvements have been effected to take care of the increasing volume of business of the new corporation.

Keystone Watch Case Corporation

The Keystone Watch Case Corporation is the successor to several watch-case manufactur-

ing companies formerly in Philadelphia, Newark, and Riverside, N. J., that had been in business for many years, the oldest dating from 1854.

The company's plant at Riverside manufactures all kinds of solid gold, gold filled, rolled-plate and nickel watch cases for pocket and wrist watches for men and women. It is also interested in a watch-case plant at Toronto, Canada.

Aside from its watch-case business, the concern owns the Howard watch plant at Waltham, Mass., where the Howard watch has been manufactured under that name for more than 75 years.

The Keystone Watch Case Corporation also owns the Riverside Metal Company, manufacturers of high-grade phosphor-bronze and nickel-silver in bars, wire, and sheets. It has in its activities about 1200 employees.

De Laval Steam Turbine Company

The works of the De Laval Steam Turbine Company were established at Trenton in 1901 for manufacturing the impulse type of steam turbine, double-helical speed-reduction gears, and high efficiency centrifugal pumps and compressors. Dr. De Laval, himself, spent 15 years in the development of his turbine.

The plant occupies over 50 acres of suburban land and contains 275,000 square feet of floor space. The machine shop, erecting shop, and double-helical gear shop are served by cranes of from 5 to 20 tons capacity. There have been built recently a three-story pattern and pattern-storage building and a three-story shop for small pumps and turbines. The turbine room of the power plant contains three direct-current generators with a total capacity of 1,075 kilowatts.

The plant normally employs from 900 to 1,000 men, who are for the most part skilled workers. All products must be thoroughly tested as to capacity and efficiency before they leave the works. This requires extensive equipment of boilers, condensers, calibrated tanks, venturi meters, speed-calibrated direct-current motors, steam turbines, speed-reducing and speed-increasing gears, voltmeters, ammeters, and test blocks.

Production is limited to the one class of product, centrifugal machinery of closely allied types, all having the same general characteristics of design and requiring the same processes and equipment for their manufacture.

American Type Founders Company

The American Type Founders Company has a capital of $13,000,000 and operates factories in Jersey City and in Elizabeth.

Printing types are the principal product. These are made in the Jersey City plant. Here is by far the largest type foundry in existence, with its products leading the type fashions of the world. The parent company was established in Philadelphia in 1796, and in 1806 this concern acquired the type foundry brought from France in 1785 by Benjamin Franklin. In 1876 the parent type foundry had become the leading type manufacturer of the world. By 1903 other type foundries had been merged in a new corporation, the American Type Founders Company, and the manufacture of types was concentrated in Jersey City. In addition to its own manufactures, the company is a general provider for the printing industry, equipping complete printing plants from its stocks at its various sales branches.

In 1911 the company developed the automatic rapid printing press known as the Kelly press. The manufacture of this machine began in the Jersey City plant, but the demand necessitated the erection in 1924 of the factory in Elizabeth, where four sizes of the press are made. The company owns a large area of adjoining real estate in anticipation of expansion.

The Jersey City foundry has a productive capacity equaling that of all the type foundries of Europe.

United States Cast Iron Pipe and Foundry Company

The United States Cast Iron Pipe and Foundry Company, which operates 11 plants in eight states, enlarged and improved its Burlington plant in 1926 until now the New Jersey plant claims to be one of the finest specialty gray-iron shops in the country. The first pipe foundry in New Jersey was constructed at Weymouth in

1810 and supplied pipe at that early date for the Philadelphia water system. The present plant of the company is the outgrowth of the McNeal foundry established in 1866.

The new plant, operated on the De Lavaud system, comprises eight centrifugal machines, of which five are operated regularly at a total output of approximately 1200 lengths of four to 12 inch pipe a day.

The buildings have been laid out to insure continuous movement of production through all stages from the material yard to the shipping department. The heart of the plant is the foundry. This is adjoined on one side by the annealing room building and the sheds for cleaning, coating, and testing the pipe, and on the other side by the cupola houses in which are four cupolas having a capacity for melting 20 tons of iron an hour.

Materials are brought to the plant on Delaware River barges and by railroad cars. Huge cranes span the material yards, where pig iron is unloaded by magnets and placed in skips on tracks equipped with scales for weighing the contents.

Two cupolas pour molten iron into reservoir ladles having a capacity of 12,000 pounds and mounted upon wide-gage tracks. They are tilted electrically, and the iron is fed into pouring ladles which are transferred by cranes to the casting floors. Here the pipe is cast, transported hot by cranes to the battery of electrically controlled annealing ovens, and finally going to the cleaning, coating, and testing sheds.

Fuel oil is stored in the two 125,000 gallon tanks, from which it is pumped to the points of consumption. A power building houses 2,500 kilowatt rotary converters which step down alternating current of 23,000 volts to direct current of 230 volts. An 800 cubic foot air compressor supplies air for ramming cores and operating air hammers. Two 900 gallon hydraulic pumps operating at 140 pounds provide the supply of water pumped from the Delaware River, for operating the De Lavaud machines, and a smaller pump operating at 500 pounds furnishes the water for testing the pipe.

General Cigar Co., Inc.

There is no better example of how a business has been nationalized than is furnished by the General Cigar Co., Inc. This concern is an outgrowth of the United Cigars Manufacturers Co. The organization took its present name March 1, 1917. At that time it entered a merger with M. A. Gunst & Co., Inc., the Conway Cigar Co., and Best & Russell. The factories and warehouses include those formerly operated by Theobald & Oppenheimer Co., Inc., and Bondy & Lederer.

The concern's net profits have risen steadily from $1,165,509 in 1910 to $3,340,435 in 1920. Business slackened in 1921, but instead of a deficit there was a net of $2,113,885.79.

In the old days before the nationalizing policy was started, the company had something like 150 brands. Its sales on these had run up to 450,000,000 cigars. Then it cut down to five brands, and a little later introduced the Wm. Penn, a five-cent seller, which increased the line to six brands. Total sales then climbed to the huge total of 700,000,000 cigars annually. The company's expansion is attributed largely to its successful advertising.

Cigar manufacturing has always been largely a local business. There is scarcely a town of any size in the country that has not at least one cigar manufacturer. But the opportunity existed for a national brand of cigars, just as there was opportunity for other products of nation-wide consumption. The General Cigar Co. took advantage of this opening. It proceeded gradually to abandon its wide assortment of sectionally known brands and to concentrate on the half dozen varieties that it selected for national promotion. The favorable outcome proved the wisdom of this new policy.

The manufacturing department comprises 55 units and is located in 48 cities. The warehouse department has 24 units and is located in 17 cities. The corporation claims that its six big sellers now get from three to five times as much retail display as did the 150 brands in the old days.

The General Cigar Company's plant at New Brunswick has 913 employees, with 92,541 square feet of floor space; the Perth Amboy

plant has 880 employees, with 72,481 square feet of floor space; the Woodbridge plant has 91 employees; the Fords plant has 175; the South River plant has 392, with 35,940 square feet of floor space; and the Carteret plant has 274 employees, with 22,991 square feet of floor space. The total number of employees at present is 2,725, and the annual output has a value of $215,500,000.

Diehl Manufacturing Company

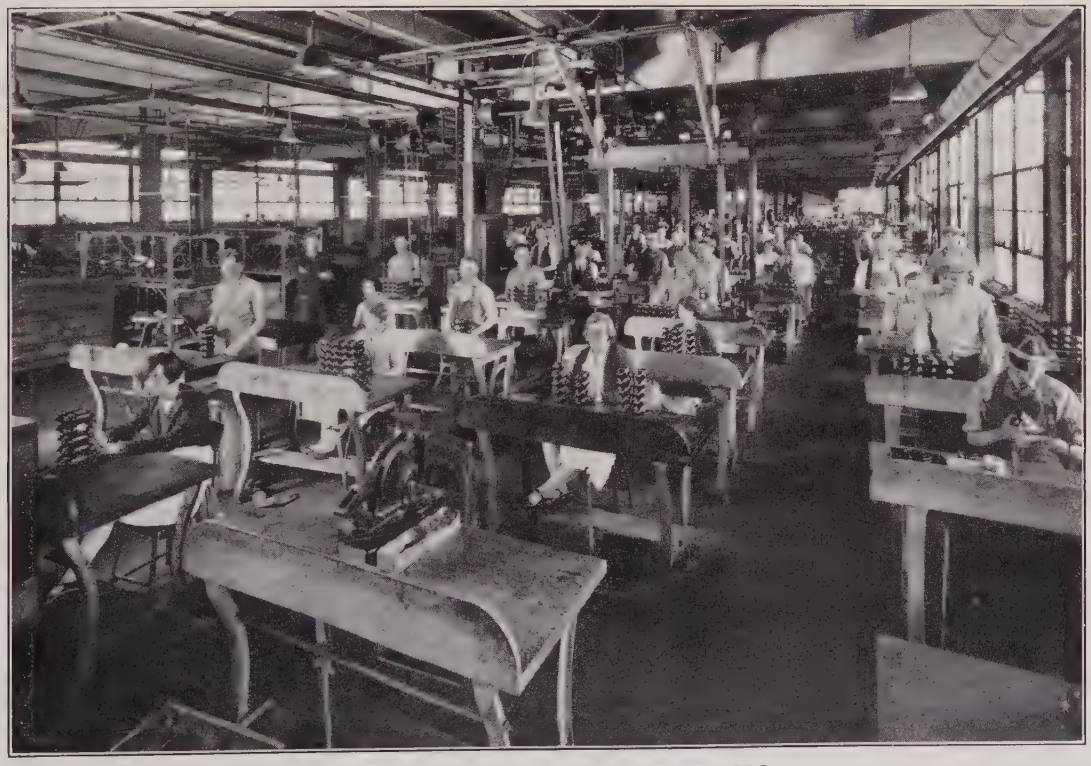
In the year 1879, when the electrical era began and the present-day electric text-books would have been incomprehensible to the most advanced student of the times, Philip Diehl, of Elizabeth, developed a small power motor having a variable air gap by means of which adjustable speeds were obtained. This machine, still in operating condition, is considered to be the first adjustable speed motor ever built. Mr. Diehl's experiments were carried on in the cellar of his home.

In 1884 at the Franklin Institute Exhibition, Mr. Diehl showed a dynamo with a variable air gap for regulating the current for arc lamps, small power motors, and incandescent lamps. In June, 1889, the Diehl ceiling fan was developed, this being the first electrical ceiling fan on the market. Ceiling fans previously had been limited to the belt operating type.

From this beginning, the Diehl Manufacturing Company rose above obstacles and added new items to its lines of manufacture. The company now produces electric fans, motors, and generators.

In 1890, Mr. Diehl constructed a sewing machine motor of the balance wheel type, the first of its kind to be placed in general use. This motor was concealed within the balance wheel of the sewing machine. The Singer Manufacturing Company, makers of Singer sewing machines, became interested in this development, and the Diehl Manufacturing Company was commissioned to build all of their electric motors.

In recent years the development of an individual motor drive for both family and factory type sewing machines increased motor



ASSEMBLING SEWING MACHINE MOTORS
Diehl Manufacturing Company at Elizabeth

requirements tremendously, and in 1918 the Diehl Manufacturing Company was merged with the Singer Manufacturing Company to insure a constant supply of motors for their sewing machines.

The Diehl company employs 1,000 people and occupies over 300,000 square feet of floor space in the production of motors, generators, and fans. The plant is located at Elizabethport, on Newark Bay, giving both rail and harbor shipping facilities. It includes a large factory and machine shop equipped with modern apparatus for the production of the larger items. Electric fans and small motors are produced in a new three-story modern fireproof building over 600 feet long. This plant is equipped with automatic tools and the many mechanical devices essential to modern manufacture.

Products of the Diehl Company include standard power motors, generators, and motor-generator sets; sewing machine motors, textile motors, electrical vehicle motors, motors for special application, electric absorption dynamometers, and motor-driven exhaust and ventilating fans and blowers; electric fans of desk, bracket, ceiling, gyrating, and column types; and also power apparatus and fans for Government departments, naval vessels and railway coaches.

The complete electrical machinery for a number of submarines now in service has also been furnished. This equipment consists of the main driving motor used when the ship is submerged, also smaller auxiliary motors required for steering the ship. In addition there are pump motors, hull ventilating motors, and hydroplane motors, which latter cause the ship to dive.

L. E. Waterman Company

The L. E. Waterman Company plant at Newark covers five acres and 75% of its outer wall space is glass, thus making it a sunny workshop where employees have the further advantage of a restaurant, hospital, library, rest rooms, and other modernized working conditions. The company was founded in 1883 when L. E. Waterman made his first fountain pen in a back room in New York where, with almost no assistance, he made by hand a total of 200 pens.

Mr. Waterman was an insurance agent who lost an important policy because the pen with which the applicant started to sign made an ugly blot and caused him to change his mind. The agent then and there decided he would never again lose a sale for such a silly reason and the Waterman fountain pen was the result.

To-day these fountain pens, in a variety of models, are in use in every country where writing is employed. The company has factories at home and abroad and its other products are ink and mechanical pencils.

Millions of Waterman pens play a part in the transaction of the world's business. It was with a Waterman pen that President Wilson, Lloyd George, and the representatives of eleven other nations signed the Treaty of Versailles, ending the World War. Secretary Kellogg more recently used a Waterman's to sign the Pact of Paris outlawing war as a national policy, and it was with another Waterman's that Lindbergh charted his navigation high above the Atlantic on that memorable, history-making flight.

The Newark factory employs 750 persons on 210 distinct operations in the making of its product. Of these, 80 operations are concerned with the gold, iridium tipped point alone. Each pen is inspected six times. More than $100,000 is salvaged annually in gold dust from the burned clothing of workers, the water in which they wash, and floor sweepings. Most of the machinery used is designed in the company's machine shop.

Even the raw materials contribute to the romance of the enterprise, coming as they do from the far corners of the earth, for there are gold, silver, iridium, rubber, and the ingredients of ink which must be garnered from far-off places. The business is still directed by the descendants of its founder.

Lenox, Inc.

The announcement that an American china had been admitted to the Ceramic Museum at Sevres, France, was an important one. The name "Sevres" to the lover of ceramics conjures up a picture of the finest work of the

FULPER POTTERY MADE AT FLEMINGTON AND TRENTON IS NOTED FOR ITS GRACE AND COLOR

AN EXHIBIT OF THE PEERLESS LENOX WARE MADE IN TRENTON

world's greatest potters and ceramic artists. The exhibit, consisting of 34 pieces, now on display in the museum, is the product of Lenox, Inc., of Trenton.

Lenox ware graces the tables of the presidents of three republics—the United States, Cuba and Venezuela. The service in the White House consists of 1700 pieces. This ware is noted for the even symmetry of design and the perfection of the china itself, as no pieces with flaws ever reach the market. The President's service bears the coat of arms in the center in gold on the ivory tinted background. Then comes a gold band with raised stars for each of the 48 States. Then a wider band of cobalt and another gold band with faultless scroll work.

Walter Scott Lenox, as a boy, decided to be a potter. He learned the ancient trade and in his spare time studied designing. His burning ambition was to make an American china that would compete with the best china of Europe. Many American potteries were then branding their wares with English trade-marks to sell them. Lenox worked to secure an American counterpart of the Irish Beleek ware. He worked with Irish immigrant potters and finally achieved what is now known as Lenox ware—a rich ivory body with a perfect glaze.

Harassed with debts, he began production. Then he went blind. Other men would have quit, but not Lenox. Eventually the company burned its notes in a little kiln set up in the office. Success had come. America had a china of which it could be proud. Walter Scott Lenox passed away only a few years ago.

National Silk Dyeing Company

The National Silk Dyeing Company was formed in 1908 and is a combination of the following corporations: Auger & Simon Silk Dyeing Company, Geeting Silk Dyeing Company, Knipscher & Maass Silk Dyeing Company, Kearms Brothers Silk Dyeing Company, all of Paterson, and Lotte Brothers Company, of Allentown, Pa.

Five plants are maintained in Paterson, while other factories are located at East Paterson, Allentown and Williamsport. A Canadian branch, known as the Dominion Silk Dyeing & Finishing Company, Ltd., is situated at Drummondville, Quebec.

The company's activities cover practically all lines of dyeing, finishing, and printing of silk, rayon, celanese and mixed fibers. One of the major operations is the dyeing of hosiery and ribbons, both pure dyes and weighted being employed. The printing of these articles is also a regular part of the day's work.

The piece dyeing and finishing of crepe de chines, crepe satins, and georgettes is done with skill. Piece dyeing and finishing, with both pure dye and weighted, is done at the Dundee Lake works, East Paterson, the Pennsylvania works at Williamsport, the Valley works at Paterson, and at the Dominion works in Canada.

This company specializes in the weighting of piece goods of all descriptions and its equipment for this processing is modern and complete. Moire is also done, and the dyeing and finishing of Jersey cloth, tricolette knitted fabrics, and all silk, rayon, and mixtures are specialties.

The National Silk Dyeing Company maintains research and experimental laboratories. Approximately 2000 persons are employed in the Paterson plants and vicinity, which includes the Dundee Lake plant at East Paterson.

Corn Products Refining Company

The manufacture of products from corn represents an important New Jersey industry, and the Edgewater plant of the Corn Products Refining Company, built in 1901 as the property of the New York Glucose Company, has a grinding capacity of 25,000 bushels of corn daily. Edgewater was the nucleus for the present Corn Products Refining Company, which also operates two plants in Illinois, one in Missouri, and several abroad.

The concern now grinds approximately 15,000 bushels of corn daily, the products being laundry and edible starches, as well as starches for commercial uses; dextrines, the basis of various gums and other adhesives; corn syrup for confectionery purposes, and the basic product of Karo; sugars for the baking, confectionery, ice cream, candy, and artificial silk industries, as well as Dextrose, a health sugar.

The process of operation consists in steeping the soluble matter from the shelled corn and grinding and separating the resultant mass by gravity and screening methods into starch, which amounts to approximately 65 per cent of the mass of corn. The germ of the corn kernel contains a valuable by-product, corn oil, which when refined is sold under the trade name of "Mazola," a salad and cooking oil. The fiber and protein-bearing materials, when dried, make a cattle food. The starch is treated and dried for numerous purposes or converted and refined into corn syrup and corn sugar.

J. B. Van Sciver Company

The J. B. Van Sciver Company furniture factory at Camden covers 10 acres, where are manufactured great quantities of quality furniture from the plainest styles to the most sumptuous designs. Almost all the furniture which the company manufactures is sold at retail in its own establishment. However, some furniture is shipped to customers in every State and nearly every country.

This establishment has achieved success notwithstanding that it is outside of the store sections of Camden and Philadelphia. It manufactures and sells furniture for homes, offices, banks, hotels, hospitals, clubhouses, and institutions. The company also designs and makes furniture for ships, fitting and decorating the interiors with a skill that has added to its fame. It has a staff of decorators at the service of customers.

The factory is electrically equipped and the machinery is modern. The furniture here produced is designed in the company's studios. The delivery system is unique. The dustproof blue and gold vans of the company, 40 in all, deliver furniture throughout New York State, Maryland, Delaware, New Jersey, and Pennsylvania.

Aside from cabinet furniture, the company also manufactures upholstered furniture. Selected kiln-dried lumber is used in all framework. Designs and finishes of wicker furniture are supplied to meet the requirements of every modern home. For the manufacture of cabinet furniture this concern brings its wood from far markets direct to the plant, where it is dried and cured in the company's own kilns.

The showrooms contain furniture from the leading factories in the United States and from noted manufacturers abroad. Antiques from Europe and America add to the variety. The sales floors also show 84 partitioned rooms, in which suites are displayed in a homelike atmosphere.

The Fulper Pottery Company

The Fulper Pottery Company was established many years ago in Flemington. Early in January, 1928, it acquired the old Anchor Pottery in Trenton and with these two very large plants its capacity for production is equal to that of any other art pottery in the United States. In fact, it is the only art pottery east of Ohio. Showrooms are maintained at the Flemington works and they attract many visitors from far and near.

The making of the artware is confined to the Flemington plant, the Trenton plant being utilized entirely for the production of what is known as Stangl ware. This is a plain color, glazed, teaware of varying designs and three distinct glazes,—Persian yellow, colonial blue and silver green. It is the only teaware of its type made in America. Fulper has recently perfected and placed upon the market the only crackle-glaze produced in this country.

Warren Webster & Company

The idea of manufacturers rendering service is now widely accepted, but Warren Webster & Company, of Camden, manufacturers of steam-heating systems, feed-water heaters and steam traps, was operating on a service basis 40 years ago, when service by manufacturers was exceedingly uncommon.

This concern has installed more than 46,000 systems of steam heating, and has grown steadily since 1888. The same executives who built the business lead it today. The policy of co-operation with owners, architects, engineers and heating contractors prevails. The corporation was a pioneer in the development of the vacuum system of steam heating.

In 1888 the Webster factory consisted of one

small building, but growth of the business made it necessary to move to a larger plant in 1909. This plant was enlarged five times between 1909 and 1923 to meet increasing demands. In 1924 the company moved into a new and modern plant. Here Webster-system equipment is made by skilled workmen with automatic machinery. A staff of engineers with completely equipped laboratories is engaged in research to improve the Company's products.

The diagnosis of heating troubles, the selection of suitable apparatus, and the details of application are all a part of the job of the heating specialist. It is this kind of service that is regarded as essential in the Webster system.

Kolster Radio Corporation

The Kolster Radio Corporation, makers of radio receiving sets and speakers, with its manufacturing subsidiary, Brandes Products Corporation, a pioneer in radio since 1908, now occupies five buildings in Newark, with a floor space of seven acres. There are 3000 employees at the height of the annual activities.

DEPARTMENT STORE ESCALATOR MADE BY THE OTIS ELEVATOR COMPANY AT HARRISON

In addition to the five Newark shops there are a laboratory, service department, and factory for transmitting-sets and radio-compasses

HANDSOME INTERIOR AT THE GALLERIES OF THE J. B. VAN SCIVER CO. FURNITURE-FACTORY STORE IN CAMDEN

at Palo Alto, California; a factory at Toronto, Canada, and another near London, England.

Dr. F. A. Kolster, the company's research engineer, founded the radio laboratory in the United States Bureau of Standards in 1912 and was its chief for eight years. He invented the decremeter used by radio inspectors to see that equipment obeys the requirements of the law, and he also invented the radio compass or direction finder in use on ships.

STONE, CLAY AND GLASS

Atlantic Terra Cotta Company

The largest plant of the four operated by the Atlantic Terra Cotta Company is in Perth Amboy. While the manufacture of terra cotta by this concern was started in 1878, the origin of the first plant dates back to 1848, when the firm was known as A. Hall & Son.

Terra cotta was only a minor product in those early days, but in 1878 the factory was rebuilt to manufacture architectural terra cotta alone, and since then the size of the plant has been increased many times.

Terra cotta manufactured in Perth Amboy is shipped all over the United States and Canada, to South America, Cuba, Porto Rico, Australia, South Africa, and particularly to Japan. Many of the largest and finest buildings in Japan are faced with Atlantic terra cotta.

Among the noteworthy terra-cotta buildings of the United States are the Woolworth Building in New York; the New York Central Building; the Philadelphia Museum of Art and the Atlantic Refining Company Building in Philadelphia; the Dade County Court House and Miami City Hall in Miami; the Cuban Telephone Building in Havana; the Fulton County Court House in Atlanta, and many office buildings, hotels, apartment houses, theaters, stores and churches.

Vineland Flint Glass Works

The Vineland Flint Glass Works has as its principal items of production the glass bottles used in vacuum bottle cases, glass tubing, rods of all sizes and colors used by the bathroom fixture trade, and bathroom towel bars. The tubing is used mostly by the makers of intricate chemical laboratory apparatus. An interesting specialty is the glass tubing for sign manufacturers who use neon gas in connection with electric signs.

This plant in addition to producing the type of glass used with X-ray machines, also manufactures iridescent art glass.

National Fire-Proofing Company

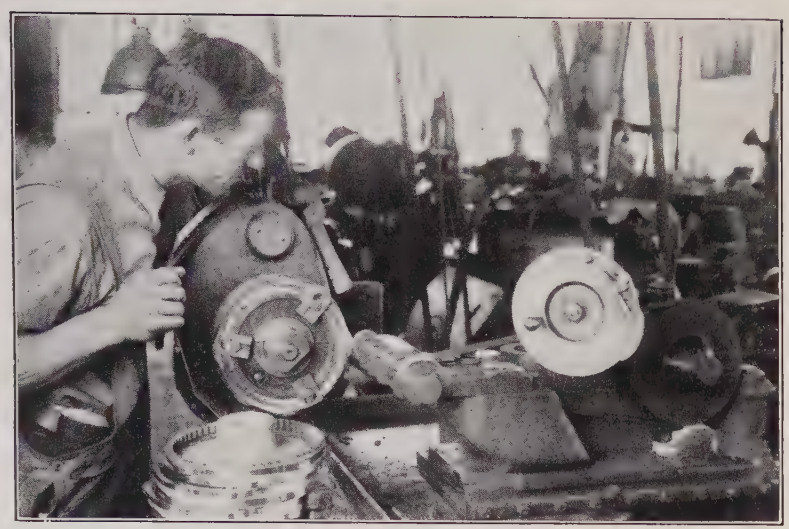
The National Fire-Proofing Company operates 23 hollow tile manufacturing plants, six of these being in New Jersey. Three are in Perth Amboy, one at Lorillard, one at Port Murray, and one at South River.

This company produces a high quality of clay tile for many purposes. Among the products are fire-proofing for walls, floors, and partitions; tile for buildings with facing of stucco or brick veneer; tile for interior walls of gymnasiums, hotels, corridors, and hospitals; and underground glazed conduit for electrical cables.

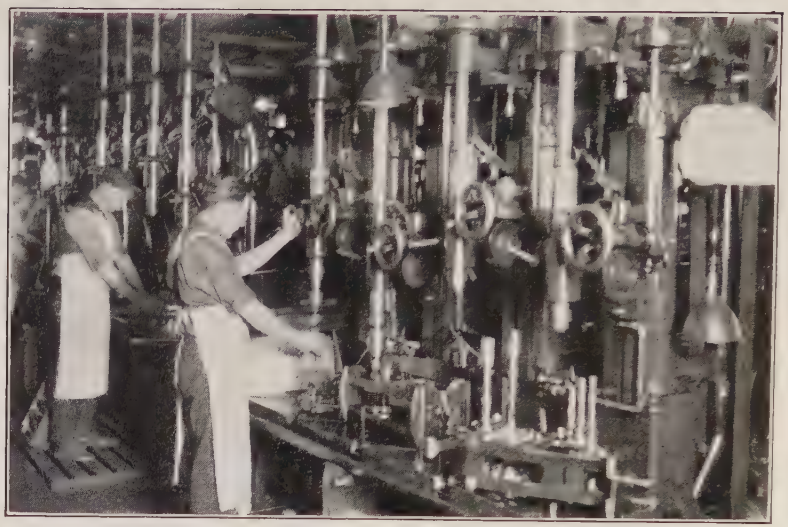
Trent Tile Co., Inc.

The Trent Tile Company manufactures floor, wall and trim tile at Trenton. This tile is used for lining vats in chemical plants where the products must have sanitary surroundings during processing. Among these products are foods, pharmaceuticals, cosmetics, fruit juices, and patent medicines. Their tiles are also used for factory libraries, lunch rooms, rest rooms, wash rooms, and lavatories.

The Trent Tile Company was early a manufacturer of ceramic mosaic tile in white and all other colors. The liking for colored tile in homes and public buildings is not a new one. The Trent Tile's earliest products were largely in color. Also the first vestibules, fireplace facings and bath-room tiles were mainly in color. Early examples of these tiles may still be seen in the displays at the plant, along with mosaics that were hand-made.

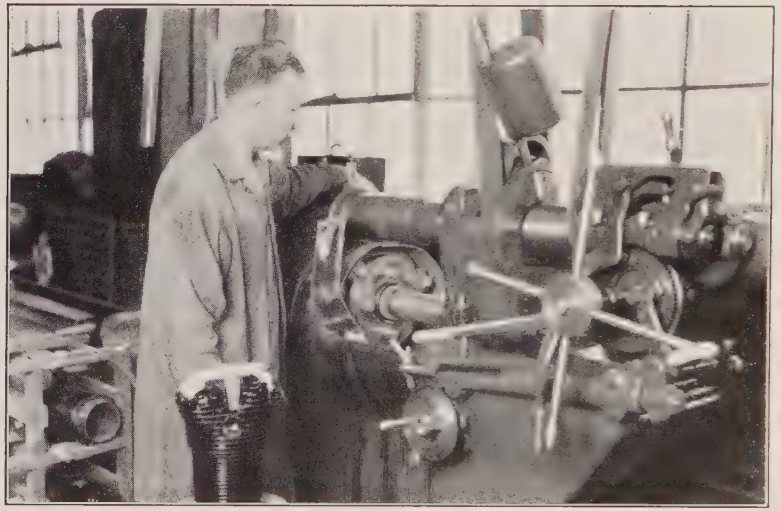


GRINDING FOUR-LOBE PROFILE OF CAM
Wright Aeronautical Co.



DRILLING OPERATIONS ON CONNECTING RODS
Wright Aeronautical Co. Paterson

ASSEMBLING WHIRLWIND ENGINE
Wright Aeronautical Co.



GRINDING BORE OF CYLINDER BARREL
Wright Aeronautical Co.

American Enameled Brick & Tile Company

The use of enameled and glazed brick goes back to a very early period in the history of mankind. Some fragments taken from Egyptian tombs are remarkable for their coloring. Very little progress was made from the time of the Pharaohs until the Italian Renaissance. During the latter period many new colors were introduced, and the art was generally much improved.

During the last 50 years the technique has been revised. Modern science has introduced more durable enamels and glazes, and modern machinery has standardized the product. Enameled brick is used wherever light and sanitation are required, and also for artistic effects. The product finds its use on exteriors as well as the interiors of buildings.

The American Enameled Brick & Tile Company, at South River, is a large producer of this product.

Illinois Glass Company

The Illinois Glass Company has at its Bridgeton plant a new and modern bottle factory. It employs 750 people, and its daily production is 5,900 gross, or 849,600 bottles. It is well equipped with five continuous tank furnaces and 28 automatic bottle-blowing machines. The plant turns out daily 2,500 wooden boxes and 12,000 fiber boxes. It covers 50 acres and includes three miles of track.

The company also has a big plant in Vineland, where it produces chemical glassware. It furnishes a complete service to the bottle user.

The corporation owns its own sand mills, producing the sand for its glass. It makes the bottle, the cork to fit the bottle, the paper used in packing the bottle, the corrugated or wooden box in which the bottle is packed, the printed label and carton to the consumer, and makes the machinery used in filling, labeling, corking, and conveying the bottles.

Carborundum Company

The Carborundum Company, known as a leading manufacturer of electric furnace abrasives and abrasive products, operates a separate plant at Keasby, for the manufacture of its super-refractory products. This is the only plant devoted to the manufacture of super-refractory firebrick and refractory shapes. The principal product of the Carborundum Company at its Perth Amboy plant consists of refractory materials made from silicon carbide sold under the trade name of "Carborundum."

These products are noted for their extreme refractoriness, resistance to abrasion, strength at high temperatures, and high thermal conductivity. The plant also produces refractories of all kinds made from electrically fused aluminum and other electric furnace products.

The Carborundum Company has been a pioneer in the development of refractories made from materials other than fireclay, silica, magnesite, or chrome, and has been successful in producing a line of specialized refractories which have solved many problems in furnaces used by dozens of industries.

Kimble Glass Works

One of the interesting industries in South Jersey is the Kimble Glass Works, at Vineland in the heart of the Jersey sand area. As early as 1904 Colonel Evan E. Kimble saw a future in the field of dairy glassware and began its production on a small basis. As a result there is now manufactured by this concern a complete line of glassware for the dairy industries and all standard items of glass for organized laboratory work.

It was recognized that to produce dairy glassware careful supervision was necessary, and that furthermore it was desirable to manufacture this ware in one factory. Every operation in the production of Kimble New Process bottles from molten glass to the finished article is performed in the main plant at Vineland.

Starting with a batch of special formula, the ingredients are mechanically mixed, and melted in a large tank instead of in small pots. This produces a highly resistant glass of uniform composition which will withstand all reasonable thermal change and mechanical shock.

The bodies are blown in a mold and immediately transferred to a lehr where they receive

their initial annealing. The necks of the bottles are made from automatic machine-made tubing. This tubing has the advantage over hand-made tubing in that its uniformity of diameter and wall thickness insure greater accuracy in calibration.

At the plant at Vineland the engineers have developed a multiple graduating and numbering machine which is completely automatic. Twelve necks are placed in this machine, and in a single operation they are lined with the Bureau of Standards type graduation, at the same time being marked with the Kimble numerals.

This method of lining and numbering, with its advantages of mechanical accuracy, further eliminates the factor of human error.

In fusing the necks of the bodies a gas flame is applied. During this operation severe strains are introduced, so the bottles are sent through a specially constructed lehr where they are reannealed.

This process relieves all strains in the glass caused by unequal heating and cooling in the sealing operation, thereby eliminating the invisible weakness in test bottles.

The Kimble black-filling enamel for lines and numerals is an achievement of the research laboratory and is really a fused-in glass enamel. It sticks so tenaciously that it is practically a part of the bottle.

When bottles are immersed for 24 hours in a boiling solution of cleaner, there is no apparent effect on the filler, the lines and numerals remaining black.

Every Kimble Babcock bottle and Babcock pipette is inspected and retested for accuracy before it is packed so that it may meet with the requirements laid down by the State in which the ware is used.

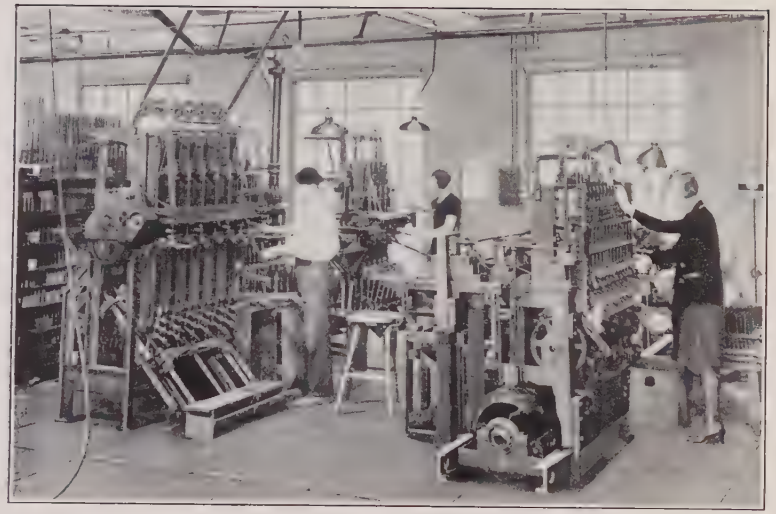
Salem Glass Works

The Salem Glass Works was established in 1868, and at first consisted of pot furnaces only. Two colors of glass were produced—light green and amber—and all bottles were made by hand.

As the business developed and improvements in glass manufacture were brought about, the Salem Glass Works built small semi-automatic machines for making bottles. In this method, a hand-gatherer dropped the glass into the mould, but instead of the slow hand operations, compressed air operated the machines and blew the bottles. The colors were increased to five—light green, amber, white flint, emerald green and blue. Many bottles, resembling the imported French and German varieties, were made in special colors.

Later, the semi-automatic machines were replaced by complete automatic machines, and attention was then given to the development of a continuous pan-annealing lehr. This has progressed slowly, but at the present time a satisfactory automatic lehr has been installed. This machine takes up the bottle, carries it through the lehr until it is thoroughly annealed and cooled, and transfers it to the examining end.

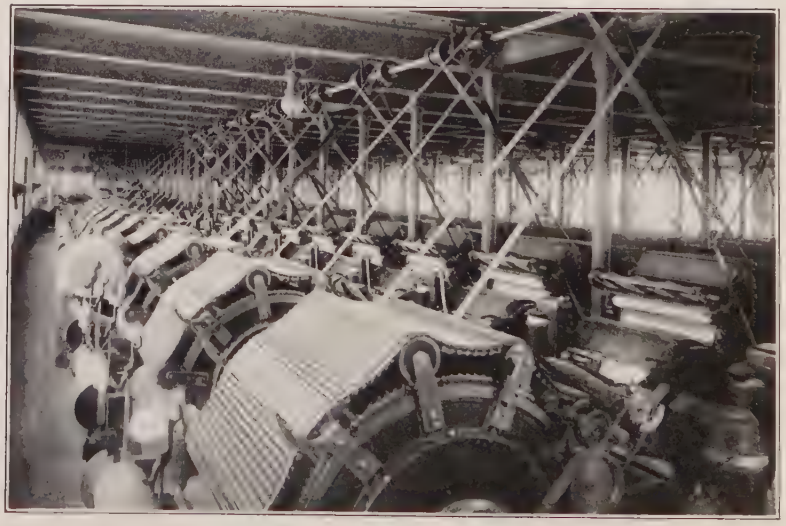
Every process in the making of glass bottles is done by machines with the exception of inspection and packing. The sand is taken from the freight cars, mixed, passed into the furnace, melted and fused by extreme heat, carried from the furnace to the machines, revolved in the machines, transferred to the lehr and passed on to the inspection end—a complete bottle—without the touch of a human hand. At the present time, the Salem Glass Works is equipped with the most modern machinery and uses the latest known methods in bottle-making.



MAKING LABORATORY EQUIPMENT
Kimble Glass Co. Landisville

DELIVERY WAGONS MADE BY FITZGIBBON & CRISP AT TRENTON

MOTOR DEPARTMENT
Mack Truck Corporation. Plainfield



COMBING OUT ABSORBENT COTTON AT
JOHNSON & JOHNSON PLANT. NEW BRUNSWICK

IRON AND STEEL AND THEIR PRODUCTS

Warren Foundry & Pipe Company

The Warren Foundry & Pipe Company, manufacturing cast-iron gas and water pipe, pipe fittings, and a variety of cylindrical castings, located at Phillipsburg, was organized under the name of the Warren Foundry and Machine Company in 1856. The following year it was awarded a bronze medal by the American Institute for its superior product. The product varies from 1⅜-inch tubes to pressure pipe 84 inches interior diameter.

The company has a capacity of 85,000 tons per year and employs 650 men. It handles an average of 24 cars a day to move raw materials, supplies, and the products that are shipped.

J. Edward Ogden Company

The J. Edward Ogden Company and its associate, the Star Expansion Bolt Company, have their plant at Bayonne. The Ogden Company manufactures specialties including heavy doors, ferry-bridge machinery, transfer-bridge machinery, and special hoisting equipment.

The doors are chiefly used as the cargo openings in the sides of pier sheds, dirigible and airplane hangars, large warehouses, and railroad buildings. The company is a large factor in the ferry bridge and similar business.

The Star Expansion Bolt Company manufactures drills, drill holders, toggles, and concrete inserts, as well as expansion shields and accessories.

Taylor-Wharton Iron & Steel Company

The Taylor-Wharton Iron and Steel Company at High Bridge is the modern and successful development of a business which had its beginning in early Colonial times. The deposits of iron ore underlying the town, abundant timber in the hills for charcoal, and water power, were the chief factors in starting the industry in that district. Messrs. Allen and Turner were the founders, organizing the business in 1742. They later employed Robert Taylor to manage the plant for them. Shoes for oxen, horses and mules, wagon iron, nails and crude farming implements formed the major portion of the early output.

Various kinds of products have been made here for every war in which the United States has been engaged. The company has advanced from the production of cannon balls in the early days to the manufacture of the large Hadfield projectiles, used in the Spanish-American War. Years ago many products were taken by wagon freight to Philadelphia.

The Nasmyth hammer, made at Manchester, England, and imported to Falls Village, Conn., by Horatio Ames, probably about 1850, was later transferred to New Jersey, and still stands as a monument on the site where this company used it so many years. This hammer is one of the first steam hammers employed in America, and is single-acting, the steam being used only to lift the hammer, while the blow is derived from the force of gravity.

With the building of a railroad through High Bridge, railroad materials became predominant in the company's production. The first work for the railroads was chiefly in the production of rolling stock, coupling links and pins, axles, and wheels, commencing with the chilled-iron wheel and later including also the steel-tired wheel. In the steel-tired wheel the company specialized on what was known as the fused or welded wheel. This wheel had a steel tire and a cast-iron center, which were fused or welded together so that it was really solid and practically of one piece with no bolts or rings to loosen. The principle of one-piece construction was later carried out in the development of the rolled steel wheel. This was solid throughout, and it superseded the solid wheel made of the two materials—steel and iron.

The greatest change in modern timés was the introduction in 1892 of the manufacture of alloy steels. The idea of using manganese steel to make a car wheel was tried but found

MACHINE SHOP
Bethlehem Steel Company. Elizabeth

unsuitable. Finally it was found that the same qualities which made manganese steel a failure for steam railroad car wheels, promised a great success for the track work on which the wheels ran; namely, the frogs, switches, and crossovers of both steam and electric railways.

Athenia Steel Company

The Athenia Steel Company was formed in 1907 and has made a specialty of producing high-grade materials for watch-spring and watch-part purposes, steel for writing pens and for umbrella ribs, feeler-gage steel, spring-steel for textile purposes, and for clock, watch, and motor springs. The product duplicates the high-grade Swedish metal, which before this company was formed was entirely imported from Sweden. It employs from 200 to 300 men, and the factory property covers 22 acres.

American Steel & Wire Company

The Trenton plant of the American Steel & Wire Company was established on February 2, 1847, and had as its first president the widely-known and respected manufacturer and philanthropist, Peter Cooper. With him was associated Abram S. Hewitt and others.

In 1868 Cooper-Hewitt & Company installed a Siemens' regenerative furnace, and in December of that year produced in Trenton the first open-hearth steel made in America. In 1887 the Trenton Iron Company began the manufacture of wire rope for use on aerial tramways. After nearly threescore years of corporate existence, the Trenton Iron Company in 1905 was acquired by the American Steel & Wire Company and became known as the Trenton Works of that company.

The American Steel & Wire Company is the largest manufacturer of wire and wire products in the United States. Wire rope and locked coil cable for aerial tramways manufactured at Trenton are shipped all over the world. The reputation for quality established by Peter Cooper and Charles Hewitt has ever been safeguarded.

Employment is normally provided for 550 persons, whose health and safety are of con-

stant concern. Adequate safeguarding of machinery, education in safety, and the services of a visiting nurse have effectively minimized the number of accidents and time lost through sickness by the employees.

Bethlehem Steel Corporation

The Bethlehem Steel Corporation at its Moore Plant at Elizabeth manufactures deck and engine-room auxiliaries for all classes of vessels, covering a wide range of types and sizes. This plant was formerly the works of Samuel L. Moore & Sons Corporation, ship and machinery builders. On the present site manufacturing activities have been carried on since 1886, and it is of interest to note that the products of this plant have been used largely in connection with the building, repairing, and reconditioning of vessels. During 1916 and 1917 the Moore Plant was practically rebuilt and the equipment modernized.

One of the principal products of the Moore Plant is ship deck machinery. This includes steam and electric motor-driven steering engines of various types, such as the combined spur or worm-geared and screw-geared type, the spur and bevel-geared spring quadrant type and its modifications, the worm-geared drum type (combined hand and steam), and electric hydraulic steering gears of the variable-throw pump plunger type. Other products are steering-gear transmissions, steering columns, shafting transmissions, hydraulic telemotor transmissions, capstans, gypsies, windlasses, single or compound-geared deck winches, mooring winches for either steam or electric motor drives, hand-operated coaling and hatch winches, and hawser reels.

A well-known line of engine-room auxiliaries is manufactured here. This is the Weir-type equipment, which has a known reputation for dependability and economy in service.

Weir-type pumps are made for a wide variety of uses. The reciprocating type includes feed pumps, general service pumps, fuel-oil service pumps, fuel-oil transfer pumps, forced lubrication pumps, and cargo pumps. Turbine and motor-driven pumps are built for boiler-feed,

FINISHED DRILL PARTS
Machine Shop of Ingersoll-Rand Company at Phillipsburg

condensate, circulating, and general service. The motor-driven pumps and the motor-driven centrifugal pumps for bilge, sanitary, fresh water, ballast, and other services complete the line of pumps.

Weir-type feed-water heaters of the "multiflow" surface type and the direct-contact type are built for power plants.

Other Weir-type products built at the Moore Plant for power-plant service include main and auxiliary condensers, evaporators, distillers and complete evaporating and distilling plants (single and multi-effect), and single and multistage ejectors.

A specialty of this plant is the two-cycle airless injection Diesel engine. This engine is adapted for use in propelling tugs, dredges, barges, and other small vessels, and is also used for auxiliary power on large ships, and for stationary power plants.

Bethlehem (Dahl) mechanical oil-burning systems are manufactured at the Moore Plant. These systems are of the mechanical atomizing type, needing neither compressed air nor steam for atomizing the oil.

The Moore Plant is the pioneer in the manufacture of paraffine-wax factory equipment used for the extraction of paraffine wax from crude oil, and has been active in its production for 40 years.

Consolidated Safety Pin Company

The Consolidated Safety Pin Company is a combination of most of the pioneers in the safety-pin business, and can trace its history back to 1861, when it purchased the business of I. W. Stewart. The company first started manufacturing in Brooklyn, then moved to New York City, and in 1890 moved to Bloomfield, New Jersey. At that time the business was done in one small brick building. Since then there have been added about 20 times as much space for manufacturing purposes. The corporation is owned by the Chase Companies of Waterbury, Conn.

Fisher-Norris Anvil Foundry

A woman, Mrs. Harriet Fisher Andrew, is the owner and manager of the Fisher-Norris Anvil Foundry. In the 1840's the father of Mrs. Andrew's first husband, Mark Fisher, came to Trenton, and invented and patented a process of welding steel and iron. Upon the death of the founder, his son, Admiral Clark Fisher, resigned from the Navy to take up the management of the plant.

When he was taken ill and there was not a man to take the helm, his wife stepped into the breach. Rather than let the Eagle anvils and vises fall into the hands of strangers, she went into the factory. With no training whatever for the business world, she suddenly found herself the head of a large metal-working plant. Her first move was to learn every step in the business from the proper mixture in the melting pot. When every anvil manufacturer in the country was bidding for the anvil contract for the Panama Canal it was awarded to this concern.

Ferracute Machine Company

The Ferracute Machine Company, located near the shore of a lake in East Bridgeton, was founded by Oberlin Smith in 1863. Beginning as a general repair and jobbing business, it developed into the manufacture of iron verandas and fences, followed by the making of foot presses for canning factories, this leading to the present specialty of presses and dies for metal stampings.

The shops of the company were destroyed by fire in 1903. New fireproof buildings of ample size were erected, these being added to from time to time. Freight cars are loaded inside the shops by electric cranes.

The power is furnished by water-tube boilers and steam turbines, the latter direct-connected to dynamos, the exhaust steam being used for heating. Every machine is driven by electric motors, there being no line-shafting or belting.

During the World War the presses were in demand for making brass cartridge cases for ordnance, and numbers of these machines were shipped to foreign allies as well as to the American arsenals.

Sheet-metal stampings are being increasingly used in place of castings and forgings, the result being a lighter, stronger, and cheaper article. Over 4,000 presses have been shipped to one automobile manufacturer.

METALS AND THEIR PRODUCTS

The Leonard Sheet Metal Works, Inc.

The plant of this company is devoted to the manufacture of fireproof doors, windows, and kalamein work. The factory is located in Jersey City, and occupies an entire block.

The concern started in a small frame building in Hoboken in 1905 and in a short time found it necessary to move to its present location, which has been enlarged from time to time.

Some years ago when the State Department of Labor required all factories to erect fire escapes and have the opening protected with fireproof doors and windows, the Leonard Sheet Metal Works assisted the late Colonel Bryant in preparing the standard specifications.

Safety Cable Company

A power cable bears the same relation to an electric supply as pipes do to a household water supply. The Safety Cable Company, organized in 1887, occupies 13 acres of land in Bergen Point, Bayonne. There are 218,427 square feet of floor space devoted to the manufacture of rubber, varnished cambric, and impregnated paper-insulated cables for carrying voltages up to 132,000. The plant is so laid out that the raw material enters one end, flowing in a straight line through the operations to the completed product at the other end. There are 500 employees.

Of special interest is a machine which wraps the paper strips over the copper conductor for super-tension cables. This machine will apply 192 individual papers of a thickness of five-thousandths of an inch in one operation. Should one of these papers break, the machine will automatically stop in three seconds, and a semaphore will indicate the location of the broken paper.

Driver-Harris Company

Closely interwoven with the development of the electrical, mechanical, and chemical industries in New Jersey is the upbuilding of the Driver-Harris Company, of Harrison. From a small beginning in 1900 the concern has grown to be a large producer.

Electrical resistance wires in 1900 were scarcely known in this country and the only materials of that character on the market besides german silver were other alloys of nickel-steel and copper-nickel made by German concerns.

In 1905 the Driver-Harris Company entered the field of experimenting in connection with nickel-chromium alloys, and after several years, perfected a nickel-chromium alloy manufactured under the name of "Nichrome." The alloys of the corporation are used in the manufacture of ball bearings, gears, transmissions, axles, and parts carrying heavy loads.

The company also produces annually millions of pounds of brass wire for brake linings of automobiles, bronze wire for the weaving of wire cloth, pure nickel and nickel alloys, metal ropes, special castings for glass making machinery, and many metal alloys. The factory is equipped with machinery of latest design, including electric furnaces.

The Okonite Company

The Okonite Company was founded in 1878 at Passaic, and produces rubber and varnished cambric insulated wires and cables of all descriptions. It also manufactures electric friction and splicing tapes. The plant in Passaic occupies an area of five acres. Sensing in 1924 a need in the public utility field for paper-insulated cables for high-tension transmission, it joined with a London company in establishing the Okonite-Callender Cable Company of Paterson, a leading manufacturer of wire and cable. This latter plant now occupies ten acres.

The products of these two plants are used by railroads, light and power companies, electric railways, building contractors, and manufacturers of electric appliances.

ELECTROLYTIC METHOD OF RECLAIMING COPPER
Raritan Copper Works at Perth Amboy

J. Wiss & Sons Company

In 1848 Jacob Wiss, a Swiss surgical instrument maker, opened a modest shop in Bank Street, Newark, to manufacture shears and scissors. He landed at New York but decided to go on to Texas. Passing through Newark, he was attracted by the future possibilities of the town even in those early days. He secured work, but in a short time opened up a small factory on part of the ground now occupied by the Prudential Insurance Company.

Lacking other motive power for his primitive machinery, Jacob Wiss used a treadmill operated by two large St. Bernard dogs which he had brought from Switzerland as his faithful companions. The present tax burden did not trouble manufacturers in those days. A tax receipt dated August 1, 1845, signed by D. J. Camfield, collector, gives a total of $4 which was for the two dogs, and this was his only tax.

In this modest shop Jacob Wiss forged by hand his shears and scissors. The fame of these spread, and larger quarters were taken nearby. In 1887 the factory was moved to Littleton Avenue. The business has expanded steadily, and the present four-story plant covers 120,000 square feet and has over 500 employees, many with long years of service.

J. Wiss & Sons Company makes shears, scissors, tinners' snips, and hedge, grass, and pruning shears. In addition to having wide distribution in the United States and Canada, the products are shipped to Europe, Africa, Australia, and South America, even penetrating the cutlery center of Sheffield, England.

Raritan Copper Works

The Raritan Copper Works at Perth Amboy, the largest copper refinery in New Jersey, was built in 1899, with a monthly capacity of 10,000,000 pounds of refined copper. From time to time the capacity has been enlarged, until this refinery has a capacity of 45,000,000 pounds of copper and is the second largest refinery in the world.

Situated on the Raritan Bay, shipments of

crude copper for refining are received from Asia, Africa, Europe, South America, and Canada, as well as from all the copper producing States. Refined copper in the shape of wire bars, cakes, slabs, ingots, and billets is shipped from the refinery to all the commercial centers of the United States and of Europe.

The plant covers 50 acres, and the electrolytic refining is done in two large tank houses containing 3,456 electrolytic tanks. The four anode furnaces used to melt the crude copper slabs received from the smelters have a capacity of 1,340 tons, while the capacity of the refining furnaces necessary for the melting of the refined copper into the commercial shapes is 1,275 tons.

The purpose of the electrolytic refining of copper is to produce the very pure copper that the electrical industry demands, but at the same time large quantities of silver and gold which the crude copper contains are also recovered, and the refining of silver and gold is therefore an important function of a copper refinery. The Raritan Copper Works has produced in a year as much as 21,440,000 ounces of refined silver and 132,000 ounces of pure gold.

Splitdorf-Bethlehem Electrical Company

The Splitdorf-Bethlehem Electrical Company has a plant in Newark and others in Bethlehem, Pa., Chicago, Ill., and Toronto, Canada. Until 1927 it was known as the Splitdorf Electrical Company. Then it was acquired by Bethlehem interests and received its present name.

The company has a background of experience in electrical manufacturing dating from 1858, when Henry Splitdorf engaged in the making of medical batteries and coils. During the Civil War his coils were used for firing mines and in bombs. On the discovery of the Roentgen (X-Ray) he brought out a coil for this particular use.

With the advent of the automobile the company turned to the making of spark plugs, magnetos, transformers, vibrators and com-

MACHINE SHOP ERECTION FLOOR
Ferracute Machine Company at Bridgeton

plete ignition systems. It has more recently extended its business into the field of radio and airplane electrical equipment.

The Crescent Insulated Wire and Cable Company, Inc.

The Crescent Insulated Wire and Cable Company, Incorporated, was organized in 1891, under the laws of New Jersey. The products of the company cover almost the entire field of the electrical-wiring industry. More specifically, they consist in part as follows: Rubber insulated wires and cables; lead-covered wires and cables; magnet, office, and annunciator wires and cables; lamp, reinforced and heater cords; and special cords and cordage of every description. Through its subsidiary, the Crescent Armored Wire Company, all kinds of armored wires and cables are produced.

The Welsbach Company

The Welsbach Company was organized in 1887 for the production of gas mantles. The success of the gas mantle, however, was not marked until the latter part of 1893, in which year but a few hundred thousand mantles were produced. The output and sales steadily increased until, in 1916, it reached the maximum of 40,000,000 lamps. The distribution to dealers and public-service corporations was through the Company's branch offices located in all the important cities of the country. At that time the organization had about 4,000 people in its employ, with a pay-roll well over $1,000,000.

The Company has supplemented its gas-lighting business by the manufacture, sale and distribution of automatic gas water heaters, gas room heaters, electric-lighting fixtures, and recently has begun the manufacture of electric refrigerators on a large scale.

The Welsbach Company's plant is located in Gloucester City, New Jersey, and occupies a plot of 13 acres with a waterfront on the Delaware River of 650 feet. The buildings are modern in every respect, being of concrete and steel construction and having a total floor area of approximately 500,000 square feet.

Æolian Company and Votey Organ Company

The Votey Organ Company and the Æolian Company, in Garwood, are subsidiaries of the Æolian Company of New York. They make the Duo-Art player actions used in pianos and in residence and church organs. Several of the Duo-Art players are in royal palaces in Europe.

MACHINERY

Worthington Pump and Machinery Corporation

The Worthington Pump and Machinery Corporation, Worthington Works, is at the easterly end of Harrison, on land comprising 36 acres. The original factory was started in Brooklyn in 1845 by Henry R. Worthington, and the business developed so rapidly that a new location was imperative. The Harrison site was selected, and in 1904 an assemblage of factory buildings was erected, with a floor space of 750,000 square feet. Since then additional buildings were needed to accommodate increases in business, so that now the plant floor space has increased to 1,000,000 square feet.

The Worthington Works is equipped with modern machinery for quantity production. It includes foundries, machine and erecting shops, testing shops, shipping houses, pattern making, carpenter and paint shops, stock and storage houses, power plant, restaurant, and welfare departments. It has more than three miles of standard-gage railroad trackage.

Among the lines manufactured at the Worthington Works are duplex pumping machinery of direct-acting and centrifugal types, built from the smallest commercial sizes up to the huge machines required for water works, irrigation, sewage, and other large volume purposes; surface and barometric condensers, from those for small evaporative service to the largest super-power plant needs; steam-air ejectors for air-removal service; feed-water heaters for locomotive and for stationary power-plant use; and meters of varied types for cold and hot

THIS YOUNG NEW JERSEY FARMER SEEMS PROUD OF HIS PRIZE EARS OF CORN

water and oil. The normal operating force of the works consists of 2,000 employees.

The Worthington Works is one of four plants, the others being the Laidlaw Works at Cincinnati, the Snow Works at Buffalo, and the Deane-Blake-Knowles Works at Holyoke.

Henry R. Worthington, in inventing the direct-acting pump, revolutionized water-handling practice.

Crocker-Wheeler Electric Manufacturing Company

The Crocker-Wheeler Electric Manufacturing Company was founded in 1888 by Dr. Schuyler S. Wheeler and Prof. Francis B. Crocker, and was an offshoot of the C. & C. Company, founded by Dr. Wheeler and Charles G. Curtis about two years earlier. Mr. Curtis later invented the Curtis turbine.

The company moved its factory from New York to Ampere in April, 1893, and has had a steady growth since that time.

Curtis, Crocker and Wheeler were the first to establish the manufacture of electric motors. This was in 1886. Authorities say their motors have no superior on the market. The company's lifetime is contemporaneous with the era of electric power. From the first it has taken the lead in advocating the use of current, and has specialized on the applications of electricity resulting from its own creations. Many of the best and most widely used electric power designs and systems were developed by this corporation.

Ransome Concrete Machinery Company

Concrete is an important factor in New Jersey's industrial growth, and hundreds of miles of concrete roads cover the State. Giant bridges, largely made of concrete, cross the rivers to the adjoining States of New York and Pennsylvania. Tubes and tunnels go under these rivers, and massive concrete factories and office buildings are erected each year in increasing numbers in all of the cities and towns.

The proper mixing of the materials for concrete is of importance. Accuracy of the proportions is not only vital to the architect and engineer, but often proves to be the controlling factor in the speed of construction.

Back in 1850 Frederick Ransome designed the first concrete mixer, a machine that would now seem crude when compared with the present-day mixers. The first Ransome mixer in America was used on the San Francisco City Hall in 1875. From that time on this product continued to develop, until finally in 1898 the Ransome Company erected a plant in Jersey City, and in 1926 the first unit of the present large modern factory was erected in Dunellen.

As the use of concrete increased, new equipment was designed and constructed. Eighteen years ago the company developed the first portable concrete chuting plant. These steel towers and chutes made in New Jersey are used all over America and in many foreign countries.

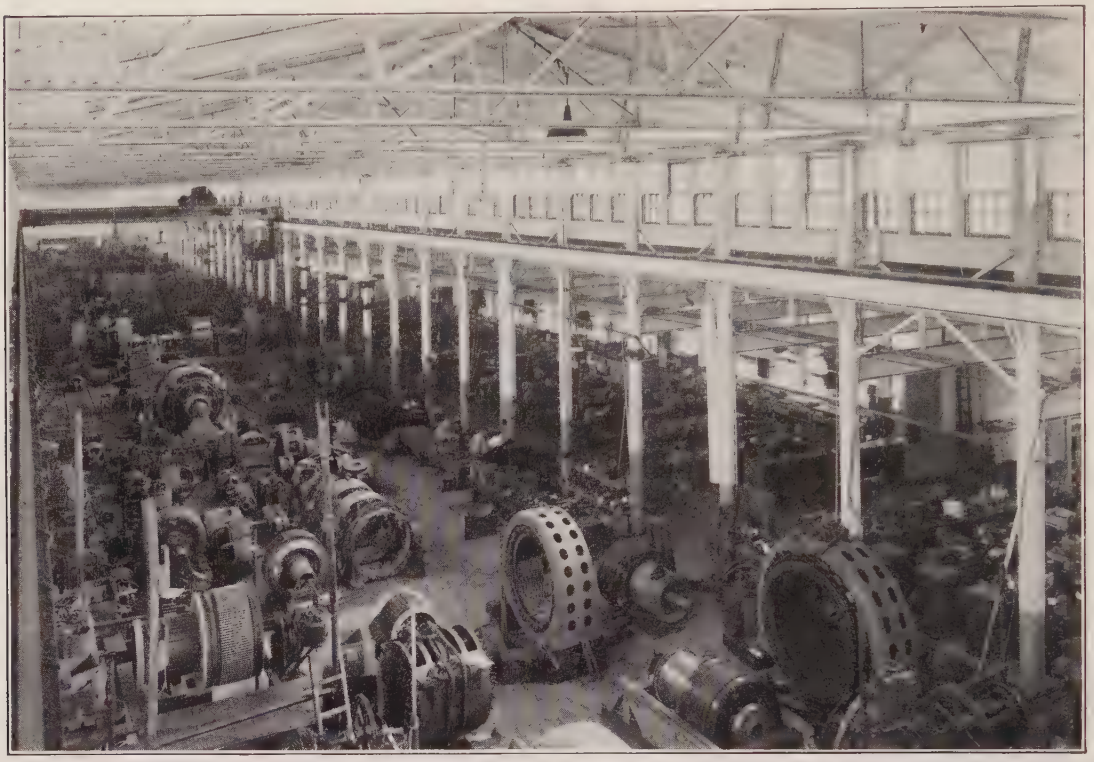
The rapid development of concrete roads has afforded a large market for the company's road pavers. These machines, mounted on caterpillar crawlers, are a familiar sight not only to the motorist in New Jersey, Michigan or Oregon, but in Venezuela or Chile as well.

In subways and tunnels one will find many Ransome pneumatic concrete mixers being used to line the interiors of the underground excavations. In this practice the concrete is blown under compressed air into the forms where it sets and hardens.

Samuel L. Langston Company

Paper-working machinery is made in Camden by the Samuel M. Langston Company. It makes equipment for manufacturing corrugated shipping cases such as are used for freight, express, and parcel-post; slitters and winders or rewinders, such as are used on the ends of board or paper machines in the finishing rooms of paper mills, or by jobbers of paper for slitting and rewinding rolls; and it also produces spiral-tube or paper-can equipment.

In addition it has some special lines, such as machines for cutting the asphalt slate-covered roofing shingles and counting and stacking them. Another interesting machine here produced is employed for making corrugated asbestos such as is used in manufacturing asbestos cellular-pipe covering.



ASSEMBLY FLOOR. LARGE MOTORS AND GENERATORS
Crocker-Wheeler Company at Ampere

Brunswick-Kroeschell Company

The part that mechanical refrigeration has exerted toward raising the standards of living and its direct effect on the preservation and conservation of perishables needs no amplification. In this work the Brunswick-Kroeschell Company has played a leading part. It was a pioneer in developing refrigerating and ice-making machinery.

This concern is a consolidation of the Kroeschell Brothers Ice Machine Company of Chicago, manufacturers of carbonic-anhydride refrigerating machinery, and the Brunswick Refrigerating Company, of New Brunswick, manufacturers of ammonia refrigerating machinery.

This company is responsible for the initiation and development of the carbonic-anhydride type of refrigerating and ice-making equipment in this country, and of the small capacity refrigerating plants for service where skilled attendance is not desirable on account of the cost.

A. B. See Elevator Company, Inc.

In 1924 the A. B. See Elevator Company purchased nine acres of undeveloped land fronting on Pacific Avenue in Jersey City, and on this property it erected a one-story fireproof factory of 2½ acres. Since that time it has built several additions which have doubled the floor area.

It manufactures at this plant practically all of the material used with the exception of castings. It is the builder of direct-connected electric elevators and has been engaged exclusively in the manufacture of this one product for 28 years.

John Waldron Corporation

The John Waldron Corporation was founded in 1827 and remained in the one family for 100 years, control then having passed to others. It was an early concern to make a business of building wall-paper printing machinery and paper-coating machinery and has made practically all classes of such machinery now in use. It was also one of the earliest to make

rubber machinery when rubber first came into use.

Otis Elevator Company

One of the first businesses to incorporate under New Jersey's protective laws was the Otis Elevator Company, which organized over a generation ago and still operates under its charter. In its extensive plant at Harrison there are made the Otis escalator and a line of passenger cars for Otis elevators. In such widely separated cities as New York, Winnipeg, Buenos Aires, Tokio, San Francisco, and Newark the escalators are in daily use in department stores, theaters, subways, and elevated railroads.

In the manufacture of passenger elevator cars, a business started only a few years ago, it combines modern production methods with artistic treatment. A large new car shop is being built and equipped to cost about $1,000,000 to care for this business.

Bates Manufacturing Company

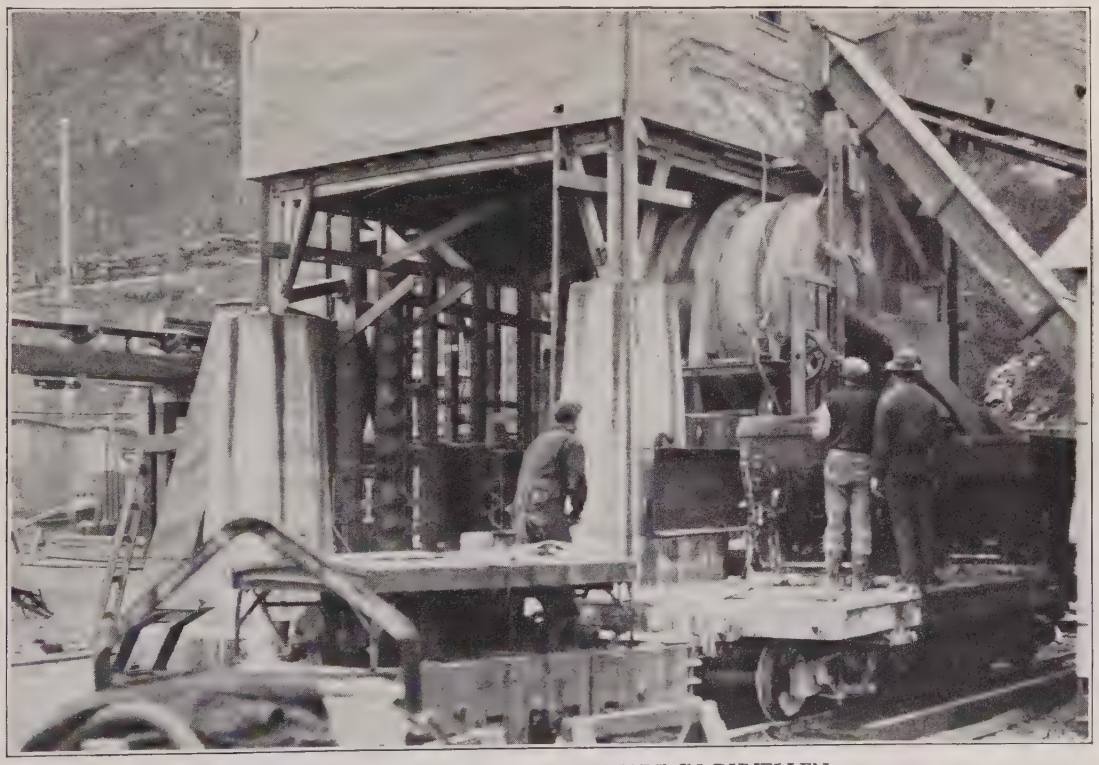
Among the many office appliances made within the State is the Bates numbering machine, made by the Bates Manufacturing Company of Orange. This product is accepted as a necessary piece of equipment in the conduct of office business.

It is interesting to note that while this machine bears the name of Bates, it was first put out under the direction of the Thomas A. Edison industries. One of the company's first presidents was Samuel Insull, the public utilities magnate of Chicago. After the war, new interests acquired the company from the Edison people, continuing its home in Orange, but moving operations into the factory of the new owners.

A. P. Smith Manufacturing Company

The A. P. Smith Manufacturing Company manufactures apparatus for tapping water mains and other carriers of liquids without shutting them off. This method was patented by Anthony P. Smith while supervisor of the old Newark Aqueduct Board and is now in use in the principal water works. The business was started in 1888 and was incorporated in 1896.

The company has a large plant at East



RANSOME CONCRETE MIXER—MADE IN DUNELLEN
Employed in building the Hudson River Bridge—Fort Lee end

Orange, near the Bloomfield line, where it also manufactures a machine for inserting a valve in a straight line of pipe without shutting it off. Other production includes a complete line of supplies and specialties for water departments.

TRANSPORTATION EQUIPMENT AND REPAIR

Tietjen and Lang Dry Dock Company

Tietjen and Lang Dry Dock Company has in Hoboken an extensive plant for repairing and reconditioning vessels. This plant was established by Frederick C. Lang in the seventies and has been in operation since. In 1916 the business was taken over as a subsidiary of the Todd Shipyards Corporation. The plant covers 23 acres, and nine dry docks are operated. Such vessels as the "Leviathan," "George Washington," "Manchuria," and "Mongolia" have been repaired at this plant.

Perth Amboy Dry Dock Company

The shores of New Jersey accommodate some of the largest and best-equipped shipyards and dry docks. Among these is the Perth Amboy Dry Dock Company, which, since its reorganization in 1894, has grown from a small yard with one dry dock with very little waterfront, until it has over 1,000 feet of waterfront with five large dry docks, the largest of which can "haul out" a ship of 10,000 tons. Only about 25 per cent of the shipping which comes to New York is too large to be accommodated on this dry dock.

The plant is equipped with compressed air and has a blacksmith and boiler shop, machine shop, pattern loft, and derricks.

Atlantic Aircraft Corporation

The Atlantic Aircraft Corporation, manufacturers of the Fokker airplane, is in Hasbrouck Heights, Bergen County. Here in an airplane factory 60,000 square feet in extent are built planes which have spanned oceans and established international records. Commander Byrd's North Pole plane, the transatlantic "America," the "Southern Cross," Miss Earhart's Boston to Wales tri-motor "Friendship," and many others were built in the plant.

The Atlantic Aircraft Corporation is constructing tri-motor transport planes for the Army and Navy and for commercial air-line operators. There are 400 employees filling orders for single-engined Fokker commercial planes from private owners and operators of air-lines.

At Passaic the corporation has another plant in the Hughton Mills occupying 37,000 square feet. Many parts are manufactured here which are later assembled at the Hasbrouck Heights plant. There are 120 employees in the Passaic works.

On the same plot of ground at Hasbrouck Heights is the Teterboro Airport, and nearby is the hangar of the Wright Aeronautical Corporation to which all planes equipped with Wright "Whirlwind" engines come for servicing.

The Fokker tri-motor F-10 carries 14 people, with Pullman compartment, baggage and mail, at a speed of 150 miles an hour.

Fitz Gibbon & Crisp, Inc.

A business established in 1849 and now a large plant producing commercial automobile bodies is that of Fitz Gibbon & Crisp, Inc. It has 300,000 square feet of floor space and builds wood and steel bodies for trucks, busses, and moving vans.

Some of the bodies are of the elevating-hoist type generally supplied to coal dealers and contractors. Other bodies are for double-deck busses and for the delivery autos of department stores.

This company was one of the first to manufacture commercial automobile bodies as well as passenger-car bodies.

Magor Car Corporation

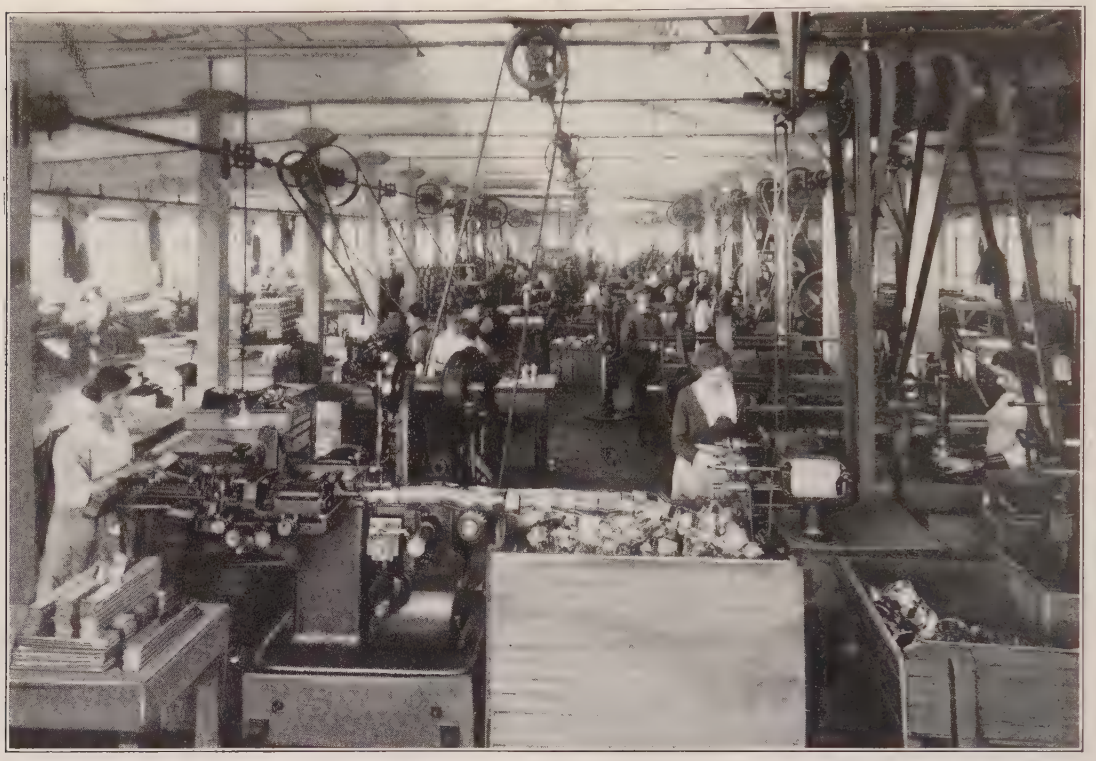
Standard railroad freight cars and special heavy car equipment for industrial companies, including iron ore and copper mines, are built by the Magor Car Corporation at Clifton. Its special cars for hauling sugar cane are practi-

ELIZABETH CHAMBER OF COMMERCE
Secretary's Office

ATLANTIC CITY CHAMBER OF COMMERCE
Credit Bureau

CAMDEN CHAMBER OF COMMERCE
Main Office

ELIZABETH CHAMBER OF COMMERCE
Board Room



CAN MAKING FOR WHIZ PRODUCTS
R. M. Hollingshead Plant at Camden

cally standard with sugar plantations in Cuba, Santo Domingo, and Porto Rico. It also builds cars for handling ore which are used in Chile, Peru, Colombia, Brazil, Manchuria, and Russia, and also special cars for logging purposes and equipment for carrying bananas.

CHEMICALS AND ALLIED PRODUCTS

R. M. Hollingshead Company

In 1892 the R. M. Hollingshead Company occupied in Camden a factory building of modest proportions for the manufacture of soaps, oils, dressings, and products for the harness and saddlery trade. The business prospered, and other articles were added. Several of these were found suitable for automobile use, and as the motor car grew in favor, new things were developed to meet its requirements.

More than 46,000,000 packages of "Whiz" products are used annually, while the distributing organization employs 400 men.

The manufacturing plant has unique features. All fluid raw materials are stored in underground tanks and pumped to compounding departments as required. All tin containers used are made in the plant. There is a rubber mill for the tube patches, sheet metal works for the display cabinets, and a machine shop for dies, jigs, and special equipment needed in the manufacturing processes.

Calco Chemical Company

For generations the United States has been largely dependent on importations to supply its needs for dyes. To help meet the domestic demand the Calco Chemical Company was started in 1915. Besides the original products, aniline oil and beta naphthol, the manufactures have been expanded to include intermediates, as the bases of dyestuffs, dyes, pharmaceutical products, sulphuric and

nitric acids, and other kindred chemical products.

Large quantities of these intermediates are also used by rubber manufacturers, copper mines, and makers of paints, dry colors, printing inks, hard-rubber substitutes, tanning extracts, etc.

The plant of the Company is located one mile west of Bound Brook, and consists of 81 buildings with 415 acres of land. Several miles of yard trackage serve the various departments. There is also a frontage of a half mile upon the Raritan River.

The buildings are of steel, brick, and concrete, designed according to the best modern practice for fire prevention and equipped with automatic sprinklers and high-pressure fire mains.

Benjamin Moore & Co.

Benjamin Moore & Company is one of the important factors in the general paint and varnish business of America, manufacturing paint products of many different types and covering practically every requirement of the paint industry. Founded in a small way in Brooklyn in 1883 with local distribution, the business has grown to one which at the present time has national distribution and operates six factories located in various industrial centers.

There are two important plants located in the State of New Jersey. One is at Carteret, where wall finishes and varnishes are manufactured on a large scale. The second is at Newark, and manufactures mixed paints, enamel, oil colors and other allied products. This latter factory serves the eastern section of the country and also the West Coast.

The Company maintains a research laboratory at the Newark plant, and in this way supervises the development of new products and the quality of the raw materials that enter into all the products made in the various factories. Here, also, practical tests are made upon the wearing and working qualities of the manufactured goods. Other plants are located at Chicago, Cleveland, St. Louis, and Toronto, Canada.

WOOL SCOURING

Eavenson & Levering. Camden. Plant covers 14 acres and is the largest wool scouring and carbonizing plant in the world

Among the products which are most popularly known are: Muresco, a hot-water wall finish, which has been on the market for over 30 years; Sani-Flat, a flat oil interior paint, which has become a standard in the industry for this type of material; Utilac, a quick-drying enamel, and Moore's House Paint.

Merck & Co., Inc.

The consolidation of Merck & Co., of New York, and the Powers-Weightman-Rosengarten Co., of Philadelphia, under the name of Merck & Co., Inc., became effective on July 1, 1927. This merger brought together chemical establishments, the founders of which are identified with the very beginning of modern industrial chemistry. The main office of the new company is at Rahway.

Both concerns have been large manufacturers of chemicals, specializing in fine prescription chemicals. Their production activities have been to a large extent complementary to each other. The name Merck has been identified with pharmacy and the chemical industry since the Seventeenth Century, and the Powers-Weightman-Rosengarten Co. traces its foundation back to 1818.

Merck & Co.'s origin was in an ancient pharmacy in Darmstadt, Germany, which came into the possession of Friedrich Jacob Merck in 1668, and which has remained in unbroken possession of this family for 259 years. This was the nucleus of the great chemical establishment now known as E. Merck, Darmstadt. Heinrich Emanuel Merck took over the pharmacy in 1816, and as the intimate friend and collaborator of the great chemist, Liebig, started it on the road from pharmacy to factory.

The preparation of pure alkaloids was the main aim of the founder of the Merck factory, and his achievements include the original manufacture, on a commercial scale, of morphine in 1827, codeine in 1836, and cocaine in 1862.

In 1891 George Merck, a son of one of the heads of the Darmstadt concern, came to the United States, to become associated with the American agency for the old house, and eventually to found the American house of Merck & Co.

At its Rahway factory, the company eventually manufactured morphine, codeine, cocaine and many other chemicals, including such salicylates as aspirin, oil of wintergreen, and salicylic acid. It also produces iodine preparations, bismuth salts, acetanilid, and chloral, besides preparing for the prescription counter most of the medicinal chemical requirements of the modern pharmacist.

Celluloid Corporation

The Celluloid Corporation's industry was founded in Albany in 1871 by John W. Hyatt, later of roller-bearing fame, and his brother Isaiah S. Hyatt. They interested several Albany financiers, and with a capital of $60,000 started a small factory.

In 1873 Col. Marshall Lefferts, Joseph Larocque, Tracy B. Edson and other New York capitalists secured a controlling interest in the newly formed company, and more extensive works were erected in Newark, where the manufacture is still centered. Its growth was so rapid that frequent increases of capital and factory facilities were found necessary, and its buildings now cover about 30 city blocks.

Because it can be made in an endless variety of colors this product is adapted to many uses. The company was the first to make an endless, jointless film base which made possible the motion picture. Later this company made the first non-inflammable photo film base which is now being used in the home picture camera. In addition to manufacturing films, sheets, rods, and tubes of both cellulose nitrate and cellulose acetate, the corporation fabricates a complete line of toilet articles, novelties, and special articles for household and industrial use.

In 1927 the industry was merged with the Safety Celluloid Company, a subsidiary of the Celanese Corporation of America, with the effect of further expansion, so that its output now represents an even greater diversity of character and application.

Lehn & Fink, Inc.

In 1918, Lehn & Fink, Inc., perfected their plans for moving their manufacturing plant from Brooklyn to Bloomfield, N. J. There, under improved conditions the manufacturing of Lehn & Fink's products has been studied

NEWARK "FOUR CORNERS"—MARKET AND BROAD STREETS AT A QUIET MOMENT

A traffic check made by the State Motor Vehicle Department for a 12-hour period, October 2, 1926, recorded the passage of 36,596 vehicles of all descriptions. There were 2,644 trolley cars, 4,098 buses, 124 horse-drawn vehicles, 2,675 taxi-cabs, 3,474 commercial vehicles, and 23,581 passenger cars. Henry M. Brinckerhoff, of Parsons, Klapp, Brinckerhoff & Douglas of New York, in a report on a survey of traffic conditions in that city, December 29, 1926, made the statement that traffic at the "Four Corners" in Newark is handled better than at Fifth Avenue and 42nd Street, New York, and that the "Four Corners" is the busiest traffic center in the world.

and developed to cater to the increased production needs of Pebeco tooth paste, Lysol disinfectant and Hind's Honey and Almond Cream. A research laboratory has been developed, where analyses are continually being made of all raw materials and outgoing merchandise. Having its own machinery for printing, for the making of cartons, and for the manufacture and printing of collapsible tin tubes, this plant is a complete unit.

After 54 years of experience in its chosen field, Lehn & Fink now exert a strong influence in the ranks of toilet-goods manufacturers.

Archer-Daniels-Midland Company

The Archer-Daniels-Midland Company are large crushers of linseed, and the plant at Edgewater has an annual crushing capacity of 7,000,000 bushels, or about 375,000 barrels of linseed oil.

Raw material is brought from the Argentine, and linseed-oil cake is exported principally to foreign countries. The linseed oil is used in this country, and a large amount of it goes to paint, varnish, and linoleum manufacturers in New Jersey.

Edgewater, with the combined crushing capacity of this company and Spencer Kellogg & Son, produces more linseed oil and cake than any other city in the world, using about 40 per cent of the flaxseed raised in the United States.

The Archer-Daniels-Midland Company employs about 525 men at its Edgewater plant, the majority of them living in New Jersey.

Pittsburgh Plate Glass Company

In the last 15 years, the output of paint, varnish and linseed oil, at the Passaic River plant of the Pittsburgh Plate Glass Company, has multiplied more than 12 times. Its volume of business is now greater each month than was its annual production in any year up to 1912.

Established 25 years ago as the Patton Paint Company, the original plant consisted of one manufacturing building, a power house and warehouse. Now its 10-acre site is occupied by seven modern buildings. The tower which houses its grain elevator rises in concrete bas-relief 160 feet above the river. A 900-foot dock, mostly concrete, facilitates water shipping. The company's general export offices for paint, varnish, lacquer, and insecticides are located here.

All the flax from which linseed oil is made is delivered by harbor boats, and all the cake linseed from which oil has been pressed is shipped out by barge and lighter. The bulk of this linseed cake is sold in Europe as fodder for cattle.

Raw materials are brought from nearly all parts of the world and the market for finished products is equally vast. Most of the flax used is brought from the Argentine, with a small part of it coming in from the Northwest. Gum for varnish is brought from South America and South Africa. Ombres and siennas are imported from Italy and Turkey. Other necessary materials come from many lands. The Company makes all of the chemical colors it requires for its processes.

Barber Asphalt Company

The Barber Asphalt Company's plant at Maurer has been in operation for 24 years. Prior to 1902, this concern was located in Long Island City. In looking around for a desirable location, it decided that the site at Maurer was suitable because of the convenient railroad and dock facilities.

It was in 1902 that the company purchased 15 acres at Maurer, and the plant started operating in March of 1903. The growth of the business made it necessary to acquire more ground, so on various occasions additional property was acquired until now the plants cover 254 acres.

The asphalt plant consists of 18 steam stills of 70 tons' capacity each, two converters of 15 tons each, a mastic plant, a slack barrel manufacturing plant, a central power and lighting plant, machine shops, and office buildings.

This plant has docks on deep water for the loading and discharging of ocean-going ships, has space for the storage of 120,000 tons of asphalt, six steel storage tanks of 160,000 barrels capacity for asphaltic material, and nine miles of railroad tracks within the area.

The Genasco roofing plant, at Genasco, just

AERIAL VIEW OF SINGER SEWING MACHINE AND DIEHL MANUFACTURING COMPANY PLANTS AT ELIZABETH

above Maurer, manufactures asphalt roofings and shingles, asphalt saturated felt, and felt base for floor coverings. It has a raw materials warehouse, two manufacturing buildings, and a finished products warehouse. This plant produces 1,280,000 square feet of asphalt roofing and 400,000 square feet of saturated felt base for floor covering per day.

J. T. Baker Chemical Company

The J. T. Baker Chemical Company was organized about 25 years ago to manufacture fine chemicals. The factory occupies 10 acres of land at Phillipsburg. The business has grown rapidly and the company's products are now shipped to Canada and Mexico, as well as to all parts of the United States.

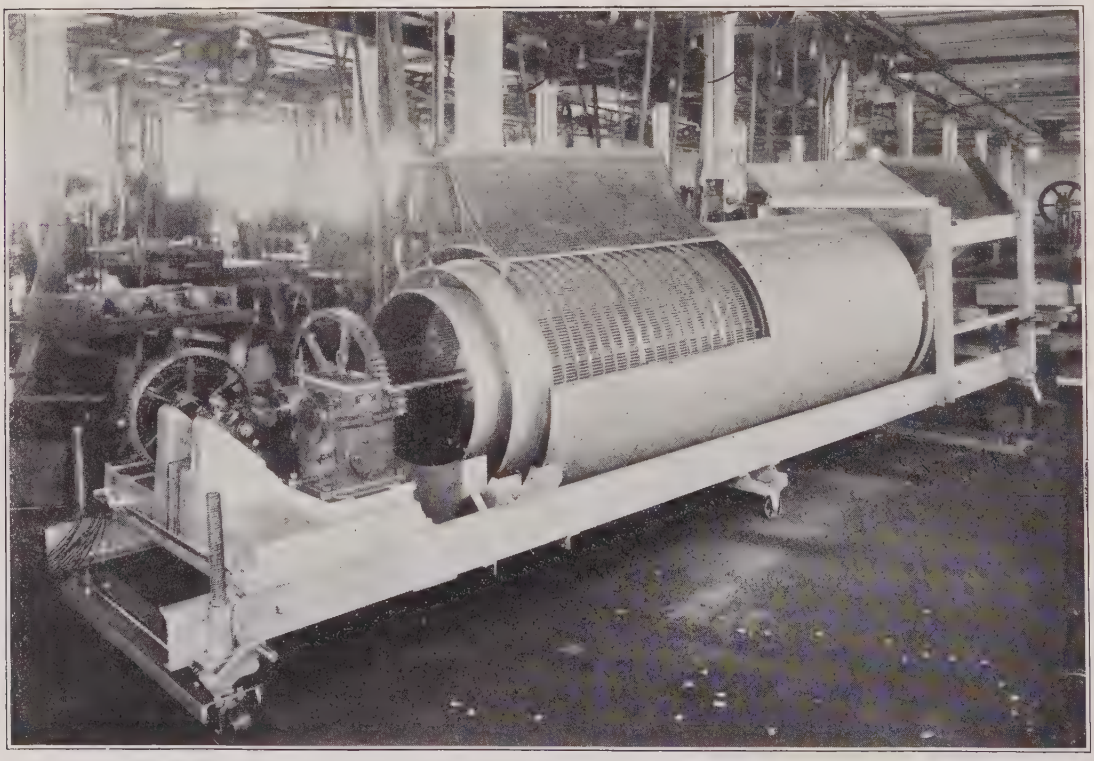
Its manufactures are pure chemicals for analytical work in steel, cement, laboratories, and a variety of other processes. It also supplies materials for experimental and research work in schools and colleges. Among its other lines are technical chemicals used in manufacturing a wide range of products, and a number of pharmaceutical chemicals for the drug trade.

The business has been unusually successful, owing chiefly to its diversification of production– there being about 1600 different articles. This is probably the reason the company has seldom felt the evil effects of dull times.

Mutual Chemical Company of America

The Mutual Chemical Company of America, whose plant is in Jersey City, is a large manufacturer of bichromates. Like many other chemicals, bichromates never reach the public. But they play an important part in the life of everyone, for they are used in the tanning of leather, in mordants, colors, paints, matches, window shades, chromium plating, drugs, pharmaceuticals, and in the manufacture of dyes and the etching of brass.

The Jersey City plant occupies 30 acres on the east bank of the Hackensack and extends to West Side Avenue. The company operates a



SORTING MACHINE IN PROCESS OF MANUFACTURE
At U. S. Tool Company Plant, Ampere

bichromate plant in Baltimore and works its own chrome mines in New Caledonia.

Other products manufactured are sulphuric acid, tanning extract, sulphate of soda, chromic acid, and oxalic acid.

John Lucas & Co., Inc.

The paint, varnish, lacquer, and color-manufacturing plant of John Lucas & Co., Inc., is located at Gibbsboro.

Beginning in 1849, John Lucas conceived the idea of manufacturing chromate colors in an old grist-mill of Revolutionary days. This mill was run by a water-wheel driven by the waters of a tributary of the Cooper River. The business grew through 80 years, manufacturing not only chromatic colors, precipitated colors of all kinds and a line of high-quality paint, but also varnish and lacquer products. The concern was incorporated in 1912 and went through a reorganization in 1922.

At the original plant at Gibbsboro, 53 buildings cover 60 acres. At Vineland, insecticides and fungicides are produced under the name of the Lucas Kil-Tone Company. The corporation also has plants at Chicago and at West Berkeley, California.

Sherwin-Williams Company

The Sherwin-Williams Company was founded at Cleveland in 1866 by Henry Alden Sherwin as a wholesaler and retailer of paints, oils, and varnishes. Four years later Edward Porter Williams came into the firm, and the new company was formed. In 1900 land was purchased on the Passaic River in Newark, and a factory was started. In July of 1901 manufacturing commenced.

The Sherwin-Williams factory at Newark has within its bounds the original buildings, incorporated now in a more up-to-date plant. The style and design of the mills now used in grinding paints are much the same as of those that were first built.

In 1873 there was one manufacturing plant producing 450,000 pounds of paints and allied products. Now there are 52 plants with a production of approximately 469,000,000 pounds.

Vulcanite Portland Cement Company

The Vulcanite Portland Cement Company was incorporated under the laws of New Jersey in 1894 by Philadelphia interests. It was led to this step by the fact that another company well known in Philadelphia at the time, the Vulcanite Paving Company, was using large quantities of portland cement which it had to import at prices that were excessive.

The Vulcanite management determined that an equally high grade of portland cement could be made in this country if proper care and supervision of the processes of manufacture were exercised. A property a few miles east of Phillipsburg was purchased and a small plant erected.

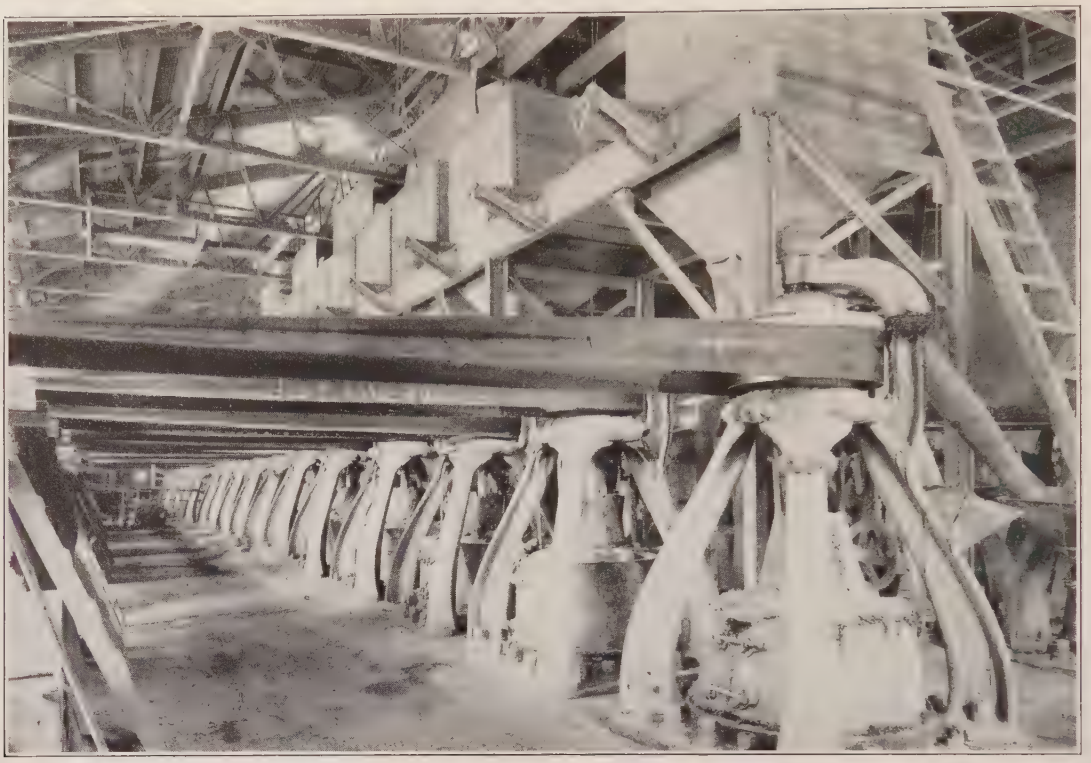
Operations commenced during the summer of 1895, the capacity then being 150 barrels per day. This has been gradually increased until the present capacity of 6,200 barrels per day has been reached. The same interests that organized the company in 1894 are still active in the management.

New Jersey cement has no superior and there are few locations where its quality is equalled. Yet it is a striking fact that of the 8,392,366 barrels of cement used in the state, on its roads and in other directions, in 1927, only about 1,000,000 barrels were manufactured within its borders. There were 4,211,938 barrels produced in New Jersey, of which about 3,000,000 were shipped to 10 other states.

The use in this state of all cement produced here would reduce the price to the consumer about one-half, this company asserts. Freight rates on New Jersey cement going to other states and rates from other states to New Jersey add this difference to the selling price.

Air Reduction Company

The business of the Air Reduction Company, Inc., is the production of oxygen, acetylene, calcium carbide, calorene (a fuel gas for cutting), nitrogen, argon, neon, helium, krypton, and xenon; also oxyacetylene welding and cutting apparatus, automatic welding and cutting machines, and welding accessories and supplies are produced.



REDUCING CEMENT CLINKERS TO A FINENESS OF 80% WHILE PASSING THROUGH A SIEVE OF 40,000 HOLES TO THE SQUARE INCH
Vulcanite Portland Cement Company, Phillipsburg

The factory is in Jersey City where there is also an oxygen liquefaction plant producing oxygen, nitrogen, and argon. At a research laboratory in Elizabethport other rare atmospheric gases are manufactured. At a works in Gloucester, acetylene is produced from calcium carbide and then compressed in cylinders for use in oxyacetylene welding and cutting. The company has 36 oxygen plants, 19 acetylene plants, two calorene plants, and two calcium carbide plants in the principal industrial centers.

The oxyacetylene welding and cutting process, though having been in use only a little more than 20 years, has become highly important in the production, fabrication, and repair of structures, machinery, tanks, barrels, and a variety of apparatus.

The air liquefaction process makes possible the recovery of all the atmospheric components, so that actually this interesting method is hardly more or less than an ingenious plan of "mining the air."

Oxweld Acetylene Company

Manufacture at the National Carbon Company's plant at Jersey City has been discontinued, the location being used as a warehouse. The Oxweld Acetylene Company, a unit of the Union Carbide & Carbon Corporation, has a factory at Newark with 199,900 square feet of floor space. About 1,000 people are here employed. This plant produces all of the equipment sold by the Oxweld Acetylene Company and the Oxweld Railway Service Company for oxyacetylene welding and cutting.

Here also are manufactured the flashlights sold by the National Carbon Company. All types and sizes of these lights are produced, from those small enough to be carried in a hand bag, to the big portable lights having a projecting power of over 1,000 feet.

Spencer Kellogg & Sons

The entrance of the Kellogg family into the linseed oil industry took place a little more than a century ago. Near Amsterdam, N. Y.,

in 1824, Supplina Kellogg, great-grandfather of the present head of Spencer Kellogg and Sons, established one of the earliest linseed oil mills, a primitive press with a daily capacity of only 20 gallons of oil. The management of the company is now in the hands of the fourth generation.

Since the founding of the present company in 1894, the uses of vegetable oil in industry have rapidly multiplied. Linseed oil, the staple of the paint industry, has become also the staple of many different industries including linoleum and waterproof products.

The mill at Edgewater has 180 linseed oil presses. Flaxseed from every producing nation is brought to these mills for the extraction and refining of its oil.

MacAndrews & Forbes Company

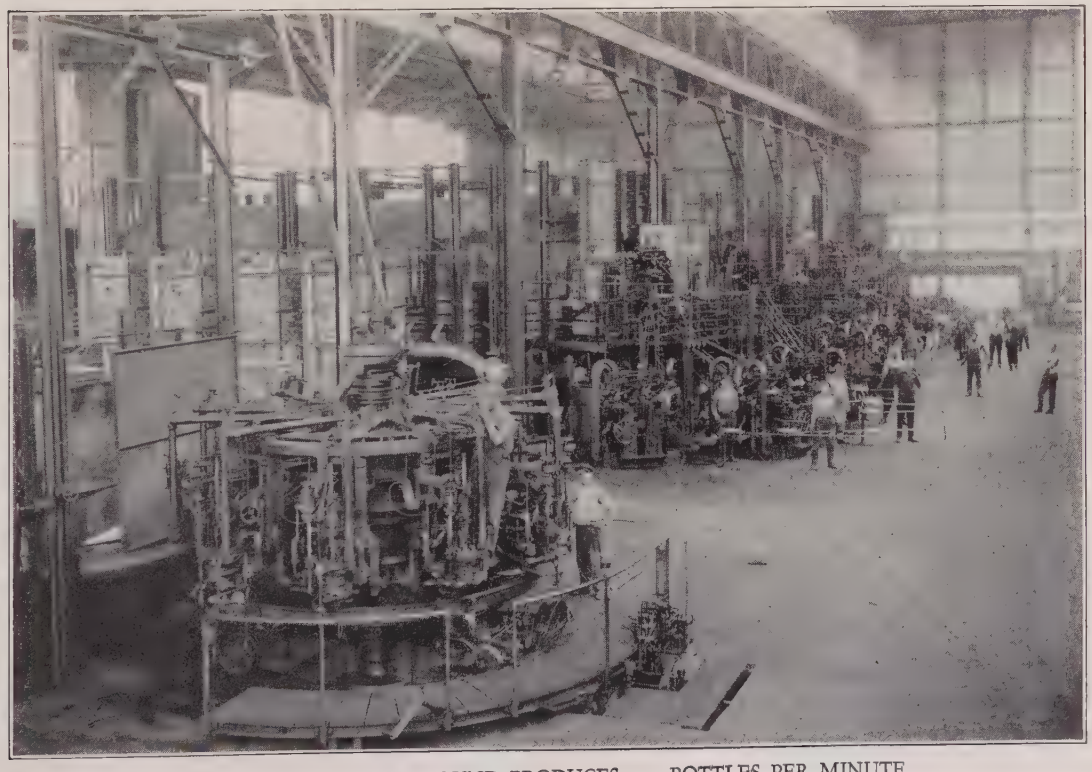
The MacAndrews & Forbes Company, of Camden, imports large quantities of licorice root from Spain, Italy, and the Near East. Licorice long has been prized as a sweetmeat and for its health-giving properties.

The company supplies extract of licorice to the tobacco and confectionery trades and to pharmaceutical houses. The so-called "spent" licorice root, formerly burned to get rid of it, now yields a series of commercially valuable by-products.

A secondary extraction is given to the root to furnish "firefoam liquid," a substance which has had success as the basis of the Foamite Fire-Extinguishing System. The residual licorice fiber is made into many kinds of boxboard, wallboard, and insulating board.

Certain-Teed Products Corporation

One linoleum plant of the Certain-teed Products Corporation is in Trenton. This plant makes a full line of linoleum and felt-base floor covering. It employs 900 people. In addition to this factory, 32 plants are operated by the company in other parts of the country. Over 1500 different items are made in these plants, and eight industries are represented in the products.



MACHINE IN FOREGROUND PRODUCES 250 BOTTLES PER MINUTE
Illinois Glass Works, Bridgeton

Hercules Powder Company

At Kenvil, in the northern part of New Jersey, is the Kenvil plant of the Hercules Powder Company. This plant, built in July of 1871, is the second dynamite plant to be built in America, and it is the oldest now working on its original location. Until 1913, the factory produced materials only for dynamite, but during 1913, smokeless powder was added. The plant embraces 1215 acres of land and gives employment to 300 people.

The experimental station of the Hercules Powder Company is near the Kenvil plant. Here about 60 technically trained men are engaged in research or development work, so that the quality of the explosives, naval stores, and nitrocellulose manufactured by the company will be improved constantly.

The Union plant of the Hercules Powder Company, at Parlin, manufactures nitrocellulose. At this factory the purified cellulose, which is cotton linters, is treated with a mixture of nitric and sulphuric acids, and the resulting nitrocellulose is then freed from excess acids, stabilized, and prepared for conversion into soluble cotton solutions. The Union plant covers several hundred acres of land and employs hundreds of men.

Walter Kidde & Company

A notable example of engineering skill, combined with manufacturing, is the plant of Walter Kidde & Company, in Bloomfield. With a highly skilled technique concerned in making apparatus for handling gas with pressures running as high as 3000 pounds per square inch, this factory is producing a unique fire-protection system which is being sent out to every part of the world.

Pioneering in the use of carbon dioxide, the company has won the approval of boards of underwriters of this country and of many foreign classification societies. The carbon dioxide when quickly released in large volumes produces an inert atmosphere resembling snow in appearance, and this manufactured atmosphere copes successfully with gasoline, pyroxylin, and other intense fires. The inert nature of the gas makes the existence of the flame impossible.

The staff of engineers of the company numbers 25, all of them college-trained men who have in hand the solving of problems of special fire hazards for every part of the world. Huge oil tankers in Germany and motorcraft made in England, Japan, and other countries are equipped with apparatus made at this plant. Likewise hundreds of motor-boats, yachts, Coast Guard patrol boats and Navy motorcraft are safeguarded with it from the dangers of gasoline fires.

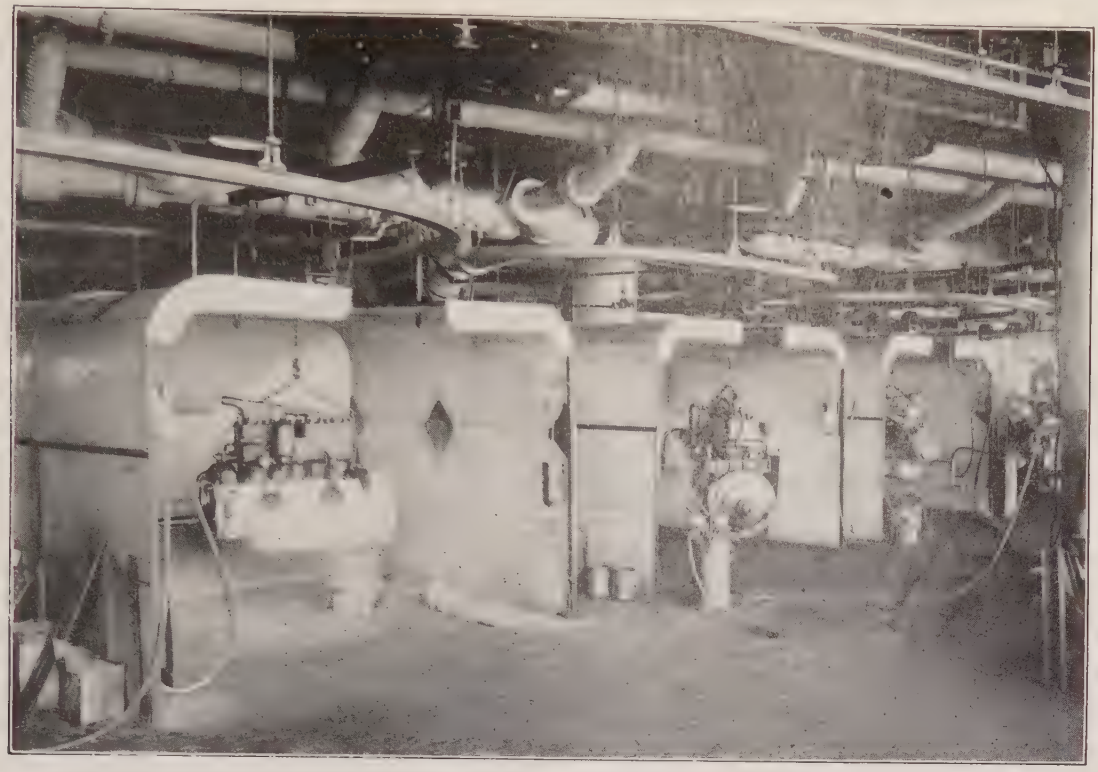
Control over flames in electrical generators and other power-plant equipment is also provided by this same apparatus. Passenger ships of Atlantic and Pacific service are equipped with a delicate smoke-detecting device which reports any fire in the holds of these ships in its incipient stage, thus providing a warning and averting catastrophes at sea. This ingenious instrument is another of the products of Walter Kidde & Company.

Joseph Dixon Crucible Company

The Joseph Dixon Crucible Company, of Jersey City, in 1927 celebrated the one-hundredth anniversary of its founding. The word "Crucible" in the name of this concern indicates the important product of its manufacture. Joseph Dixon was the inventor of the plumbago or graphite crucible now used throughout the world.

Today the company originates and makes a great variety of graphite products. The most important are lead pencils, such as the Eldorado and Ticonderoga; lumber crayons; rubber erasers, and colored crayons. Other departments produce graphite lubricants and silica-graphite paint, used as a protection for exposed metal surfaces.

The founder of this Company started a small business in Salem, Massachusetts, in 1827. From that time until the present day the company's growth has centered around this same raw material, graphite, which many call "black lead." Joseph Dixon's attention was first called to graphite by the discovery of this mineral on a New Hampshire farm. The local supply of graphite being limited, he arranged with sea captains who were sailing to the Far East to stop at Ceylon and pick up a small ton-



PUTTING FINISHING TOUCHES ON MACK TRUCK ENGINES AT THE PLAINFIELD PLANT

nage of graphite for his use. Thus commenced the business that has grown to be a world leader in its line.

Like many other corporations, the Joseph Dixon Crucible Company has reached a point where it is more or less true that the tail has come to wag the dog. Crucibles were the initial idea, but the secondary thought that added pencils to the business has become a primary purpose. The fame of the Dixon pencil has now reached the distant corners of the earth. The people of the Far East never dreamed that the mineral they were sending overseas would ultimately come back to them encased in wood.

The manufacture of pencils in the Dixon plant has become almost entirely an automatic process, from the working of the graphite and clay, to the final polishing given the wood casings.

George W. Helme Company

The present Helme Company, manufacturer of snuff at Helmetta, is one of the oldest established firms in the United States. The operations of this concern date back to 1760, by reason of its ownership and manufacture of the Lorillard brands of snuff. The Helmetta plant was established in 1825.

The Helme Company is probably the oldest established business in New Jersey. It also has a snuff factory in Delaware and leaf-tobacco plants in Virginia and Kentucky.

Baker & Co., Inc.

It is natural that such a prominent manufacturing center as Newark should be the headquarters of the platinum industry, since this metal plays such an important part in the arts. It follows, of course, that Baker & Co., Inc., the leading platinum house of this country and of the world, should be located here.

The name of Baker & Co. first appears in the Newark Directory in 1875, at which time the firm included Daniel W. Baker and John Frick, the former being the father of Charles W. Baker, who is now the company's president. The early location was at 65 Hamilton Street, and the concern was engaged in the manufacture of jewelry. This partnership apparently continued until 1879 or 1880, when

Cyrus O. Baker, junior, eldest son of Daniel W. Baker, was taken into partnership, and the business moved to 13 N. J. R. R. Avenue, near Mechanic Street.

Cyrus O. Baker had been a refiner of jewelers' wastes and a refining department was apparently added at this time to the company's business. In 1882 the plant was moved to 104 N. J. R. R. Avenue, and again in 1883 to 408 N. J. R. R. Avenue at the corner of Murray Street. This last location is at present occupied by a small portion of the company's present plant.

Cyrus Baker had discovered that in the refining of jewelers' wastes there were increasing amounts of platinum, for which there was at that time a great demand as leading-in wire for the newly invented incandescent lamp. This caused him to decide to make the recovery and working of platinum the company's chief specialty. The subsequent rapid expansion of the use of platinum in such industries as jewelry, electrical, chemical and dental, so increased platinum that the Baker plant had to be enlarged. This growth continued until now the factory occupies more than two acres, and has a floor space of nearly 100,000 square feet. Under the present arrangement there are several separate departments to supply the different industries using their products.

TEXTILES AND THEIR PRODUCTS

Barbour Flax Spinning Company

The Barbour family has been in the linen-thread business for considerably over a century. Their first mills were established in Lisburn, near Belfast, Ireland, in 1784. Barbour's linen spool threads were first manufactured in America in 1865 at a mill erected in Paterson. The mill was driven by water power. From its inception the company has produced the same high quality of linen thread as that manufactured by its parent mills in Ireland. The New Jersey factory had been in operation only

FEDERAL SHIPBUILDING WAYS AT KEARNY

a short time when it was found necessary to greatly increase its size. In 1872 the foundations for the present Grand Street Mill were laid. In the years that followed, other Barbour mills were established which engaged in the production of linen threads and twines.

The plants now are the Grand Street Mill, the Hart Mill, and the Spruce Street Mill in Paterson; the Marshall Mill in Newark; and mills at North Grafton, Mass., and Greenwich, N. Y.

Textileather Corporation

Textileather is a pyroxylin-coated fabric manufactured by the Textileather Corporation of Newark. There are three specific classifications of what are commonly known as "coated fabrics"—pyroxylin, linseed oil or oil cloth, and rubber. Pyroxylin-coated "Textileather" is made to simulate genuine leather in any color, grain, or finish.

The basic fabric used is a woven cotton textile. There are four main classifications of the textile used—sheetings, drills, sateens, and moleskins. The cotton textile is purchased from the cotton mills in the gray or undyed form and finished. The finished textile is then shipped to the plant at Newark to be manufactured into pyroxylin-coated fabrics.

The raw materials used in the pyroxylin mixture consist mainly of nitrated cotton (pyroxylin); solvents such as ethyl acetate, benzol, and denatured alcohol; and pigments, oils and preservatives. These are compounded and every finished batch is carefully tested in the laboratory.

The cloth is then put through a coating operation in which it passes under a spreader knife and receives a coating of the pyroxylin mixture. Next the cloth passes into a dry box, where the solvents are evaporated. This drying operation is repeated from 3 to 15 times, depending on the quality of goods in process.

After the coating comes the embossing or designing operation. There are two kinds of embossing, one known as the press type and the other the roller. Following this the material is ready to be finished. The final finish is applied on machines similar to the coating machines, and the operation consists of applying two-colored effects, bright, semi-bright and dull.

Armstrong Cork Company

The Armstrong Cork Company, manufacturer of linoleum, house insulation, and cork specialties, has manufacturing plants in New Jersey at New Brunswick and Camden and a subsidiary—Pennsylvania Trading Company—at Gloucester. This company is a large importer at the port of Philadelphia, an average of one ship a week docking at its private pier in Gloucester, N. J., where cork from Spain, Algeria, and other foreign countries is unloaded and warehoused.

Corkboard used for insulating purposes, cork covering, and fittings for pipes in cold-storage plants, cork machinery insulation, and other cork specialties are produced in the Camden factory.

The New Brunswick factory manufactures rugs and floor coverings.

New Jersey Worsted Mills

The New Jersey Worsted Mills is the holding company controlling the Gera Mills and the New Jersey Worsted Mills. The Gera Mills at Passaic make dress materials, coatings and suitings, while the New Jersey Worsted Mills at Garfield make worsteds and woolen yarns.

The company employs 3500 people, and has grown from a small beginning in 1901 to its present large size. The character of the products of this concern is indicated by the fact that one of its fabrics has a considerable export sale in Paris.

Burlington Silk Mills

The Burlington Silk Mills Company started in a small factory in 1908. In 1910, this original plant was abandoned and a larger one was built. In 1916 an addition was made, and since then all the old machinery has been replaced. The Burlington Silk Mills makes its own power and light. The factory has a working floor space of 60,000 square feet. The corporation has about 300 employees of whom two-thirds are women and one-third men. The product is broad silk of all descriptions, only pure silk being used. Besides the weaving, all the pre-

MAIN AND MARKET STREETS
One of Paterson's busy corners

TRENTON CHAMBER OF COMMERCE
Clerical Department, Main Office and Exhibition Room

paratory work including throwing, is done at this mill, and the yearly production is 1,500,000 yards of broad silk.

Standard Textile Products Company

The Standard Textile Products Company was organized in 1914 to succeed the Standard Oil Cloth Company, which latter was an outgrowth of a consolidation of manufacturers of oilcloth in 1901 known as the Standard Table Oil Cloth Company.

The Standard Textile Products Company is a large producer of leather cloth and oilcloth, or products made of cotton cloth, as distinguished from floor oilcloth and linoleum. The concern has an annual output of over 60,000,000 square yards of coated fabrics. Its products consist of a widely diversified line of finishes applicable as leather substitutes for the shoe, luggage, automobile, and accessory trades. It also manufactures a fabric wall covering under the name of "Sanitas."

The company has four converting plants in the North, the largest of which is at Clifton. Through subsidiaries it owns and operates four cotton mills in the South.

Textile Dyeing Company of America, Inc.

The Textile Dyeing Company of America, Inc., on the bank of the Passaic River in Hawthorne, has an up-to-date industrial plant.

Organized in 1924 it erected a modern daylight factory for weighting, dyeing, and finishing silk fabrics. The buildings have a floor space of 210,000 square feet. The area of land is 32 acres, including a private lake.

In selecting Hawthorne the company was influenced by its natural resources and its close proximity to the country's most important markets. Two additions have been made to the original plant. The output of finished goods is over 100,000 yards per day.

Pennsylvania Textile Mills, Inc.

The Pennsylvania Textile Mills, Inc., is located in Clifton and manufactures plushes for upholstery, velvets, and fur effects. The factory was built in the spring of 1924 and employs normally about 400 men and women.

All materials are woven, dyed, and finished here, from yarns spun at the company's mill in Central Falls, N. C. The products of this concern are sold to furniture manufacturers in all parts of America and Australia under the trade name of "Piletex."

A. & M. Karagheusian

A quarter of a century ago A. & M. Karagheusian, then exclusively importers of Oriental rugs, decided to weave rugs in America, and for the site of their plant they chose the town of Freehold. The business has expanded until now, with its spinning plant at Roselle Park, the company employs 1000 people.

The Karagheusian mills specialize in Wilton rugs and carpets. There are 237 looms at Freehold, beginning with the 27-inch-width machines and going up to large sizes that produce seamless rugs, 15 feet wide. All the wool for Karagheusian rugs comes from abroad, most of it direct from the Orient.

Paterson Mutual Hosiery Mills

The Paterson Mutual Hosiery Mills, maker of Ruby Ring hosiery, typifies the leadership of New Jersey in the manufacture of women's silk hosiery.

This company was one of the first to introduce ladies' full-fashioned silk stockings in America, and as pioneers they have maintained a forward position in the refinement of hosiery ever since. The product of these mills is shipped to all parts of the civilized world.

W. & J. Sloane Manufacturing Company

The W. &. J. Sloane linoleum plant at Trenton, was completed in May, 1926, the first completely new linoleum plant built in this country in nearly 20 years. Constructed at a cost of many millions of dollars, it brings under roof nearly 22 acres of floor space.

In deciding to manufacture their own linoleum, it was the aim of the Sloane organization to produce a product of superior quality. Their experience gained in 34 years of marketing linoleum had taught them what the ultimate user should have. A site of 167 acres was selected

ROLLING MILL. RIVERSIDE METAL COMPANY, RIVERSIDE, BURLINGTON COUNTY
Rolls of German silver on the floor awaiting conversion into blanks for automobile parts, telephone and radio units, silver ware and numberless other component functions

convenient to the markets for the raw materials and to an economical shipping point. In this factory are incorporated 127 improvements in layout and equipment. Certain of these effect manufacturing economies through savings in labor, through the elimination of special handling, and through the reduction of carrying charges.

With one exception, all of the buildings composing the unit are of modern one-story construction with horizontal conveyors. The flow of operation is simple, direct, and continuous, with no doubling back in any stage of production from the raw materials at one end of the plant to the shipping rooms at the other.

A calendar has rolls measuring 49 inches in diameter, between which the final mixture of cork, linseed oil, and other ingredients are pressed onto the burlap back. This is one of the most important operations in the process of manufacture, for the density, uniformity, and natural finish of the completed goods depend in a large degree on the amount of pressure to which they are subjected.

Linseed oil is one of the most important ingredients used in the production of linoleum. It is produced by crushing flax-seed obtained from the northwestern part of the United States and from Canada, Argentina, and Russia.

Cork is another important ingredient of linoleum, giving it much of its resiliency, elasticity, and its sound absorption properties. It comes principally from Spain and Northern Africa, and is delivered to the Sloane plant in irregularly shaped pieces of bark bound into bales. These pieces are run through a breaker, after which the cork is ground into fine particles. Extra grinding of the cork in special machines adds to the density and finish of the linoleum.

The sap of the Kauri pine found in New Zealand and Australia falls from the tree into the marshy ground, where, after centuries of ossification, it is mined and ground to a consistency of flour for use as a binder for linoleum.

All genuine linoleum is made with a burlap back. It is woven from jute, grown principally in India.

PAPER AND PRINTING

Janeway & Carpender

Janeway & Carpender, makers of all grades of wall paper, was established in 1872, and at its plant in Highland Park has 350 employees. The total output annually is 18,000,000 eight-yard rolls of wall paper. Three-quarters of its product is sold in the United States. The rest is exported to all parts of the world.

George La Monte & Son

The National safety paper, which is used for checks, drafts, and other negotiable instruments, is manufactured by George La Monte & Son at Nutley. They also manufacture papers for inter-line railroad tickets, coupons, certificates of deposit, and other forms which require protection against alteration and counterfeiting. These papers are treated in such a way that ink writing cannot be removed from the surface without the appearance of a white spot which exposes attempted erasure by chemical or mechanical means.

George La Monte & Son operate another mill in Toronto, Ontario. It is felt that the daily transfer of funds required by modern business has been to no small extent protected from the inroads of crooked practice by National safety paper and its allied brands.

The Paterson Parchment Paper Company

The little factory where vegetable parchment was first produced in America in 1885, was the modest early home of the Paterson Parchment Paper Company in Paterson. It was formerly called the "Old Gun Mill" because the first "Colts" were made in this same building.

There, in spite of skeptical critics, 6000 pounds of vegetable parchment were manufactured and sold in the first year. This amounts

WATCH LATHE DEPARTMENT. WESTINGHOUSE WORKS. NEWARK

HOBOKEN FROM THE AIR

Called the "Mile Square" City. Lackawanna Railroad Terminal at the left. United States, North German Lloyd, and the piers of other trans-atlantic and coast-wise lines make Hoboken a leading shipping centre

to less than one hour's run of such paper today.

Vegetable parchment was first looked upon as a novelty. However, keen producers soon realized its value as a protective wrapper for food products. Among the first to use it liberally were the cracker manufacturers. Then, in the early nineties, the butter makers and meat packers discovered its value to them.

Other makers of food soon learned how to protect their products with this new wrapper. Ice-cream manufacturers, milk shippers, cheese makers, produce men, florists, fish merchants, and finally the housewives themselves all in turn found a way in which vegetable parchment could serve in protecting foods.

The three present plants in Passaic and in Modena and Edgely, Pa., cover 700,000 square feet of floor space.

Warren Manufacturing Company

The Warren Manufacturing Company was founded in 1873. It owns and operates four paper mills, at Warren Glen, Hughesville, Riegelsville, and Milford, all in New Jersey close to the Delaware River and 40 miles north of Trenton.

The establishment of the company was mainly the result of John L. Riegel's success with a paper mill of his own. The Warren Manufacturing Company eventually absorbed the Riegel mill.

In the quaint town of Finesville, John L. Riegel in 1862 first engaged in the manufacture of paper. The old mill still stands, a picturesque landmark of the early days of papermaking.

But two miles farther down the creek and close by the Delaware River was a larger water power that attracted the attention of early settlers, and there on the northern or Warren County side of the Musconetcong were built a gristmill, a sawmill and later an oilmill. On the Hunterdon County side, a sawmill was built in 1793 by Thomas Purcell, and was followed by a second mill a few years later.

After passing through several hands, the two sawmills on the southern bank finally were acquired by John L. Riegel & Son, to secure for this company the water-rights. The mills on the northern side were purchased by John Leidy in 1819. In 1823 he sold them to his son-in-law, Benjamin Riegel, miller. In this way were the Riegels established as manufacturers.

Benjamin Riegel built a home for himself on the New Jersey side of the Delaware. This settlement first was called Musconetcong and later Riegelsville. While the town on the Pennsylvania side of the river was the first to be known as Riegelsville, it was settled later.

It is not known just what circumstances led Mr. Riegel to start making paper. The idea probably was suggested to him by Amos Davis, a manufacturer of Easton, who was anxious to enter the paper industry.

The mill finally made nothing but jute wrapping, in which the butt ends of the jute plant, a product of India, alone were used. The Warren Company is said to lead all others in the manufacture of jute papers, and uses more jute butts for paper-making than does any other concern.

In 1873 the company was incorporated, and a new site was chosen, four miles above Riegelsville, at "the forge," the site of the Greenwich forge, one of the oldest in the country. There, in the narrow valley of the Musconetcong, the first mill of the new company was erected, and August of 1873 found it in operation. Two Fourdrinier paper machines were installed, and two water-wheels supplied all the necessary power except that for the paper machines, which were driven by steam engines.

The second expansion, the building of a new mill to take advantage of a 25-foot fall in the stream just below Warren, was the result of recommendations made by John L. Riegel in 1889.

The first shipment from the new mill at Hughesville, was made in February, 1891. The company has among its customers many of those who patronized it in its earliest days.

It finally became evident that there was need for further diversification. Careful study convinced the management that glassine, a product then new in the market, offered the best possibilities, and in 1910 the first glassine was made at the Milford mill.

Art Color Printing Company

The Art Color Printing Company at Dunellen is a large printing establishment devoted entirely to the manufacture of magazines and periodicals. This plant is arranged so that the paper stock is delivered at one end, and the complete magazines come out at the other, enabling the work to be put through in a continuous operation without undue loss of time or repeated handling.

The company sets the type for the magazines, manufactures the electros, and does the presswork for the covers and the inside, in addition to doing the binding, shipping, and mailing. The plant's capacity is about 6,000,000 copies of various nationally known magazines. Five hundred people are employed.

Since the company started operations in Dunellen, the revenues of the local post office increased so enormously it was placed in the first class.

Hinde & Dauch Paper Company

In the middle eighties, two young men who had been reared on Erie County farms, invested in a power-threshing outfit and began to serve the growers of small grains in their vicinity. In order to extend their activities, they also bought a baling machine which was driven by their threshing engine. To procure employment for this equipment, they became buyers of straw, which they compressed into bales and sold to paper mills. In the year 1888 to preserve an outlet for their raw material they leased a mill in Sandusky, Ohio, and entered upon a new career. One of these young men was J. J. Hinde and the other J. J. Dauch.

Meantime in 1895 and 1896, the original partners had developed the Climax bottle wrapper. Single-faced and double-faced boards, and easy-to-handle containers made from these boards were added to the line. The development of the corrugated fiber shipping box, and its acceptance by the railroads in 1906, necessitated further expansion. About that time a plant was acquired at Hoboken. In 1910 the Hoboken plant, consisting of a paper mill and a box factory, was dismantled, and its machinery was installed in more commodious quarters in Gloucester, opposite Philadelphia.

This corporation recently absorbed the Thompson & Norris Company of Brooklyn and the J. M. Raffel Company of Baltimore. It now has 20 plants distributed over nine states and two Canadian provinces. In its several factories it manufactures numerous styles of packages and packing accessories and is a large producer of the corrugated fiber shipping box.

Osborne Company

When the Osborne Company located in Newark in 1899, its aim was to get nearer the distribution outlets, the raw-materials market, the art supply, and the printing industry. A factory was purchased on Summer Avenue, and almost immediately the company started using the first color reproductions of paintings as calendar subjects. Previously the pictures had been printed in black and white. The newer method of reproduction is known as the colortype process.

Its value and virtue lie in the fidelity with which everything in the original painting is reproduced. All that is in the picture must appear in the reproduction, because the method is photographic. Although only four colors are employed, practically any hue of the rainbow can be reproduced by the colortype process.

The rapid growth of color-printing made it necessary to handle this business apart from the Osborne organization. Accordingly the American Colortype Company, a New Jersey corporation, was formed. It became the holding corporation for the Osborne Company and the other organizations that this concern has since developed in allied lines of business. The American Colortype Company has two plants, one in New York and one in Chicago. With its subsidiaries it employs more than 2,000 persons.

The Osborne Company in its own field of effort has spread all over the world. It has plants in Toronto, London, and Sydney, and selling branches in many other cities.

To keep pace with the growth of the business the Newark plant has been enlarged sev-

BOOK BINDING DEPARTMENT, HADDON CRAFTSMEN, INC.—CAMDEN

HAND COMPOSITION ROOM, HADDON CRAFTSMEN, INC.—CAMDEN

RELOCATING AND RAISING ERIE RAILROAD OUT OF VALLEY
WHILE BUILDING WANAQUE RESERVOIR

PERTH AMBOY DRY DOCK

PETER PAN STATUE IN JOHNSON PARK AT CAMDEN

One of the most pleasing works of art in New Jersey. The characters of the story are delightfully interpreted in bronze figures.

eral times. In 1912 a new steel and concrete building was erected for manufacturing purposes and the original structure converted into executive offices. Since then several units have been completed, the latest being a concrete and brick building having 24,000 square feet of floor space.

While calendars are still the principal product, the company is a heavy creator and producer of other forms of advertising. Among these are holiday greeting cards, display cards, specialized booklets, direct-mail advertising, mailing cards, and blotters.

National Lock Washer Company

The National Lock Washer Company has plants in Newark and Riverside, N. J., and in Milwaukee, Wis. The Newark plant covers a city block.

While the business of this company is primarily that of making lock washers, it has a substantial trade in the window equipment of railway cars, many varieties of tools and in automobile brake-parts. It is about to put on the market a speed meter for boats corresponding to the speedometer of a motor-car.

Among its most distinctive productions is the "sashless" window, made wholly of glass and metal, and opening as easily as a window of an automobile. The recently built cars of the Union Pacific Railroad have been equipped with this window and it has created a sensation through all the territory it serves. Among other large customers of the firm is the Pullman Company.

No one thinks much about the importance of lock washers yet without them no automobile would run. They are the means of locking bolted parts. The National Lock Washer Company makes 20,000,000 lbs. of them a day. The lock washer was the invention of Heyward Harvey of Orange.

Employees are responsible for many of the inventions which the company has developed. A real "suggestion box" is maintained. Weekly topics for suggestions are presented by the company though suggestions are not limited to them. Each suggestion blank has a number which corresponds to a number on a stub that the employee retains. The suggestions are collected weekly and the holders of those accepted are suitably compensated at once. Not even the president of the company knows who turned in the suggestion until after it is passed upon.

ELKS BUILDING ON LINCOLN PARK, NEWARK

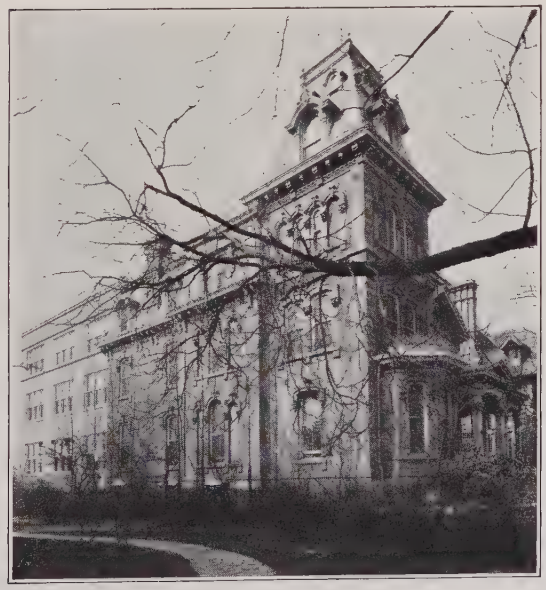
FOOD AND KINDRED PRODUCTS

Swift & Company

Although national in scope, Swift & Company has important business interests in New Jersey. This corporation has packing plants located at Jersey City, Kearny, and Newark. These three plants handle a part of the local livestock supply and prepare and distribute meat and other livestock products throughout the State as well as in the surrounding territory. Refrigerated branch selling houses, which sell direct to retailers, are in 16 of the principal cities of the State. Swift & Company's investment in these plants and branch selling houses amounts to millions of dollars. More than 1800 Swift & Company employees in New Jersey receive in excess of $3,000,000 a year in wages and salaries. In addition to these employees more than 1500 of the 47,000 shareholders of Swift & Company are residents of New Jersey. Thus about 3500 New Jersey people are associated with Swift & Company, either as employees or as shareholders.

Thomas J. Lipton, Inc.

The cultivation, manufacture, and packeting of tea is a large operation. The quality of tea depends on climatic conditions and the elevation at which it is grown. Sir Thomas Lipton has been connected with the tea industry a long time, and has a large plant and warehouse in Hoboken. Great care must be taken in the manufacturing processes from green leaf to black leaf. It takes six bushes to produce one pound of tea. The growth is checked in the center of the bush so that the energies of the plant are diverted to the side branches, from whence the young leaves are taken. The packing is done by machinery to avoid the touch of the human hand.



HOME OF THE MANUFACTURERS' ASSOCIATION OF NEW JERSEY AT TRENTON

LOOKOUT TOWER OF THE NEW JERSEY FOREST FIRE PREVENTION SERVICE

Connected with the Department of Conservation and Development. Many towers of this type are distributed over the southern pine belt.

Charms Company

The Charms Company of Newark produces as high as 50 tons of hard candy daily. It has a large production of "lollipops" and fruit tablets. The factory is of saw-tooth construction, giving ample sunlight. The air in the packing rooms is washed, dried, and kept at a constant temperature and humidity, so as to insure packing the merchandise under good conditions.

WOOD PRODUCTS—LAUNDRIES

New Jersey School Furniture Company

School furniture is made in Trenton in an old established factory. In 1870, a plant was established there by L. H. McKee & Co., in a brick building 100 feet in length. This start in making school desks was undertaken on a larger scale than it would have been, if New Jersey's new compulsory school law had not been put into effect.

The chief competitor of the firm was the local carpenter in various districts and cities who followed the designs of his predecessor in making white pine forms and benches. It was hard to convince district school trustees that "patent school desks" were hygienically better. Many held to the opinion that the old bench which was good enough for our forefathers would be good enough for our children.

However, the business made headway, and 16 years later the present company was chartered. In 1889 it built its own factory in the western end of the city. Since then various buildings have been added on a frontage of 700 feet.

Ferguson Brothers Manufacturing Company

Ferguson Brothers Manufacturing Company was incorporated in 1903, having come from New York in 1900 as Ferguson Brothers. The partnership was started in July, 1878. The business has grown steadily until the plant in Hoboken occupies 500,000 square feet of floor space and employs about 600 men. It manufactures furniture specialties, cedar and cedar-lined chests, bridge and game tables and folding chairs.

American Wolmanized Lumber Company

The American Wolmanized Lumber Company has an up-to-date wood-preserving plant in Elizabethport, and treats all kinds of industrial lumber against decay. This is done under vacuum and pressure, and the chemical employed is triolith, which has been used in Europe for a quarter of a century.

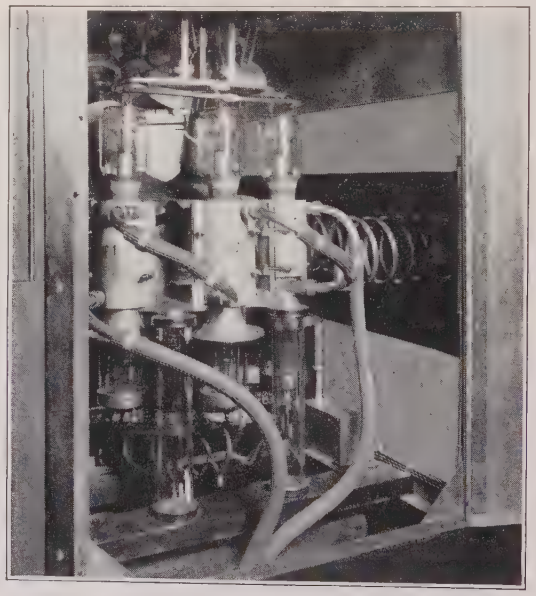
The treatment has a valuable feature, in that the lumber can be painted with mill white or other paints after treatment.

It is adapted for interior roof plank in industries where humidity is produced in the manufacturing processes, such as in paper, textile, silk, and woolen mills and dye houses.

Laundry Establishments

There are in New Jersey 466 power-laundry plants, so distributed over the State as to bring their modern service within the reach of every housewife. Although these plants, employing nearly 25,000 people and representing a capital investment of over $30,000,000, are a notable segment in the State's industrial life, they also are a force for good. They represent cleanliness and the emancipation of the housewife from the home's chief drudgery, the washtub.

Serving the progressive group of this branch of industry is the New Jersey Laundry Owners'



WATER COOLED VACUUM TUBES. RADIO TELEPHONE STATION. DEAL BEACH

Association, with offices in Newark. This trade association has been in existence under various titles for 30 years. Its purpose is to improve the variety and standard of service of its member plants through the medium of research, education of plant owners and the public; also through the training of plant operators, and through advertising.

The association has a code of standards which requires that all members shall maintain clean and sanitary plants, and that the washing process shall not only cleanse but conserve the life of the goods. This department is administered by the Newark College of Engineering, and their engineers make a thorough inspection of each member plant every three months.

PRINTING AND BOOK-BINDING

New Jersey possesses many large printing and book-binding establishments. Among them are McCrellish & Quigley (State Printers) at Trenton; Jersey City Printing Company (printers of the telephone directories) at Jersey City; Essex Press, Baker Printing Company at Newark; Sweeney Lithograph Co. at Belleville; J. Heidingsfield Co. (Rutgers Printers) at New Brunswick; Chronicle Press (printers of the Legislative Index), and Abbe Print Shop at Orange; Quinn and Boden (printers of many books), at Rahway; Art Color Printing Co. at Dunellen; and The Haddon Craftsmen, Inc., at Camden.

The Haddon Craftsmen, Inc., Camden

When the State Chamber of Commerce decided to publish this book it awarded the printing contract to The Haddon Craftsmen, Inc., at Camden because this company was equipped to handle a publication of such a nature through all its complicated manufacturing processes.

Exceptional mechanical skill was required to produce a book of the quality desired. In the art work, photo-engraving, selection and arrangement of type, this was particularly true. To gain the best effect in the reproduction of the details of the illustrations, what are known as chalk-overlays and lead-moulds were used throughout the book.

The Haddon Craftsmen, Inc., has the most modern automatic-feeder presses with extension deliveries and gas-drying equipment. The company's own electrotyping foundry made the plates from which these pages were printed, and the books were bound in its extensive bindery. There were 26 principal operations required in the binding alone: such as folding, gathering, pasting in color-pages and fly-leaves, sewing, trimming, gluing back of book to hold sections, rounding back, putting on head-bands and lining, cutting cloth and board for covers, making and stamping covers, putting book in cover, pressing, drying, examining and adjusting wrapper. Readers seldom stop to consider the processes necessary to make a book.

The Haddon Craftsmen, Inc., possessed the equipment to do all this from start to finish within its own walls. Through its well-directed organization and a corps of 500 employees it was able to do it quickly and well.

The plant of the company occupies an area of 110,000 square feet, and all its business, except that of the offices, is conducted on the ground floor of a building the exterior walls and roof of which are mostly glass.

The work of some of the largest book and magazine publishers is done in this plant. In 1928 for one house The Haddon Craftsmen, Inc., turned out 185 different books, the editions of which ranged from 1,000 to 100,000 copies. On an ordinary day the company manufactures 15,000 books and thousands of magazines and pamphlets, its books ranging in style from sombre Bibles to the gayest-colored picture-books for children, novels for all ages and weightier texts for scientists. The monthly magazines which are here printed are mailed directly from the plant to all parts of the world without going through the offices of the publishers.

L. BAMBERGER & CO. NEWARK. "ONE OF AMERICA'S GREAT STORES"

The company occupies the entire block on which the main building is located. It uses part of the basement of the Gibraltar Building shown on the extreme left of the picture and the building on the next block which is shown at the extreme right of the picture

LEADING DEPARTMENT STORES OF THE STATE

L. Bamberger & Company, "One of America's Great Stores"

Back in 1893, in the midst of one of the greatest business depressions this country has ever experienced, three men came to Newark and started a small business on Market Street. They had faith in the city and a real vision of its future. That Louis Bamberger and Felix Fuld, the surviving partners, were amply justified in that faith, is apparent from the fact that few department stores in the country exceed the volume of business which L. Bamberger & Co. transacts in a year.

The company has just completed an annex to its building, costing $13,000,000 and providing over 1,000,000 square feet of floor space. The new section, the frame of which contains 11,000 tons of steel, extends four stories below ground and 14 above, and the foundations will sustain 16 additional stories when required. The extensive area underground enables the store to receive and deliver merchandise without blocking adjacent streets with its fleet of trucks. Elevators 35 feet long carry trucks to and from the basement where the platforms are located.

Beauty has been combined with utility and 35 kinds of imported and domestic marbles have been used, besides rare woods, bronze and other fine metals. Self-leveling express elevators travel at the rate of 600 feet per minute. The store contains an ice cream factory with a daily capacity of 600 gallons and an electrically equipped daylight bakery. There will ultimately be a candy factory, a complete two-story house, an auditorium and other special features.

L. Bamberger & Company has always been interested in civic progress and co-operates in many civic enterprises. An example of this is found in the Bamberger Music Scholarships, which provide the youth of Newark's high schools with an incentive for earnest effort and the development of character. As a progressive aid to popular education it has placed radio receiving sets in the public schools.

In February, 1922, the company's radio station WOR, was established and it is now recognized as one of the most efficient stations in the East, with a radius which extends around the world. It has aimed to serve especially the cultural interests of the entire metropolitan area.

The company publishes *Charm*, a magazine devoted to home and cultural interests, which is sent monthly to more than 80,000 readers over the state.

Education is regarded as a vital factor in the conduct of the business and there is an extension division of Rutgers University in the store, through which courses in many subjects are given for the benefit of employees. Other features for their benefit include a library, a fully equipped health department, a social service department, rest rooms and cafeteria.

The Co-workers Association, to which the co-workers pay four per cent of one week's salary once a month, provides two-thirds salary to any co-worker while absent because of illness. A house magazine, "Counter Currents," devoted exclusively to co-workers' interests, is printed and sold to co-workers at two cents a copy. Season tickets for symphony concerts are distributed free to the Bamberger Music Club, composed of co-workers.

A complete lecture service, dealing with merchandise demonstration, clothing information, dressmaking and fabrics, home making, camp and personnel, is available free-of-charge to interested organizations throughout New Jersey. The Bamberger Institute offers to the public an annual course in dressmaking and designing.

The store in all its appointments is thoroughly modern and the scope and quality of its merchandise place it in the front rank among the great department stores of the United States. Its telephone shopping service is one of the outstanding features that have

KRESGE DEPARTMENT STORE IN NEWARK
One of America's most beautiful stores

MAIN FLOOR, M. E. BLATT DEPARTMENT STORE IN ATLANTIC CITY

contributed to its prosperity. Its basement store occupies the impressive area of two good-sized city blocks.

Kresge Department Store

The Kresge Department Store in Newark occupies an entirely new building, the erection of which was commenced in November, 1924, and finished in September, 1928. The present building—one of America's most beautiful department stores—occupies the site of the department store of L. S. Plaut & Company, of which it is the successor. This present splendid structure was built in units so that the business might be carried on while the old Plaut buildings were being razed.

There are 10 complete floors, two partial floors, a basement store, and two sub-basements, comprising in all a floor-area of 675,000 square feet. There are 120 departments offering every feature found in the best equipped merchandising establishments. The pleasing restaurant on the seventh floor is unsurpassed by those of the latest modern hotels. An auditorium, where local organizations meet, ample rest-rooms, and a distinctive personal service on the part of employees, are preëminent attractions contributing to that comfort and ease of the shopping public which make it something of a community center as well as a place in which merchandise is sold.

The architecture of the store interior is Spanish in general design. The lighting features and furnishings enhance the beauty and harmony of the building interior. The 18 elevators are massed lengthwise of the store in a way that is both unique and convenient. Apparatus for cooling the air of the store in summer supplies refreshing relief to shoppers in the very hot weather.

Under its several names the Kresge Store has a history of nearly half a century. It was started in a small way by Fox & Plaut back in 1870, when the horse cars rolled along Broad Street. The first store was located on the north bank of the old Morris Canal. Later it became L. S. Plaut & Company and continued under this name until purchased by Mr. Kresge in July, 1923.

M. E. Blatt Co.

Atlantic City numbers among its many choice possessions a department store of size and quality. It is the nine-story, modern building of M. E. Blatt Co. The special lighting effect entitles it to the claim of being a "daylight" store at all hours.

Such a department store one might not expect to find in a resort city, yet it is there and the enterprising owners have built up a substantial business by serving the enormous transient population and catering to the trade of the many high-class hotels.

Everything that is looked for in up-to-date department stores is here and on the top floor there is a spacious "economy store" of the type customarily found only in basements.

Hahne & Company

Hahne & Company—"Hahne's" as it is popularly known—is a third department store in Newark and one of the largest in the state. With a history of more than 70 years of business it has progressed as the city has developed.

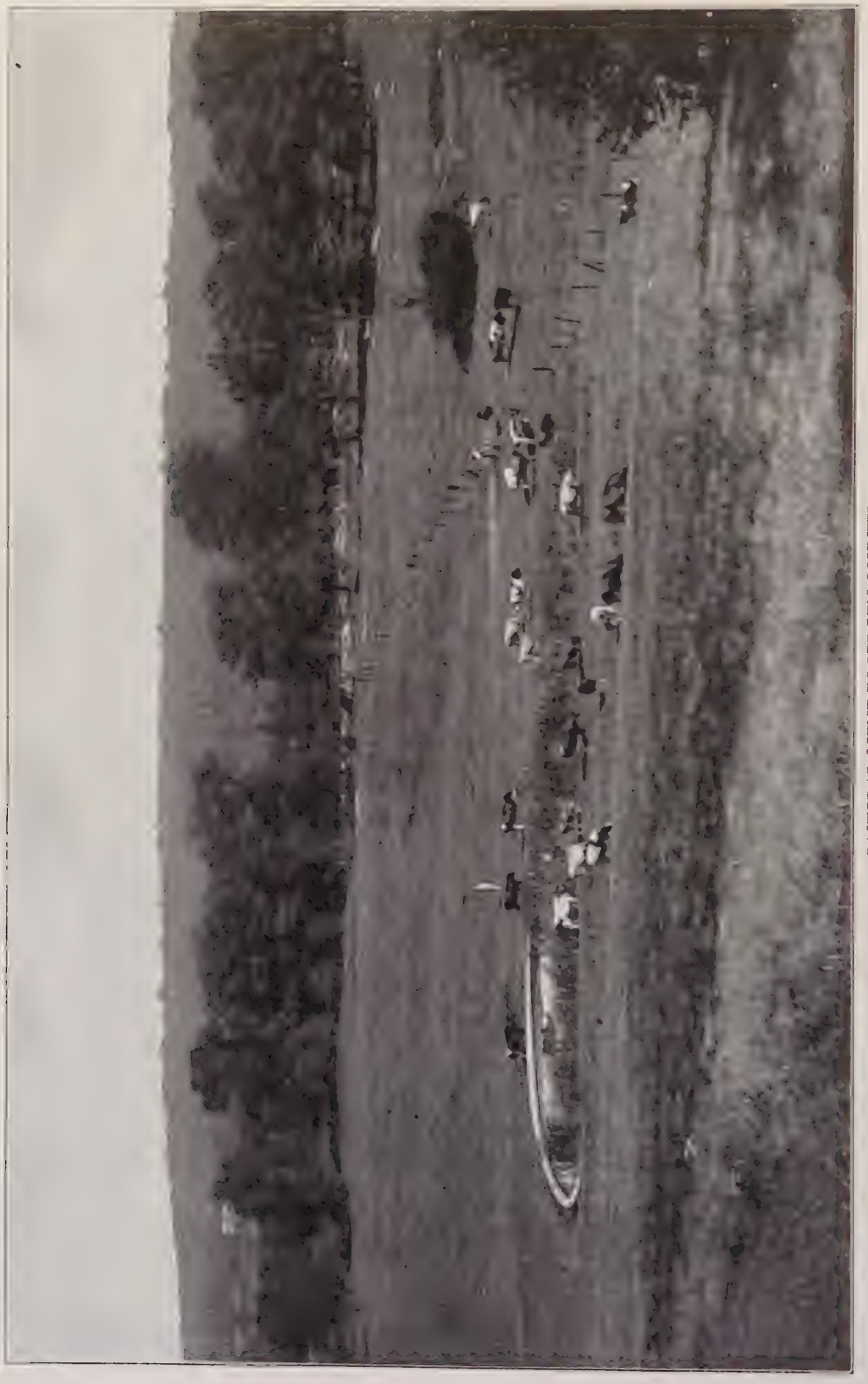
Some of its features, aside from a general merchandising business, are a model eight-room suite, a budget bureau and shopping service.

Sears, Roebuck & Co.

The new store of Sears, Roebuck & Co. in Camden, was opened July 30, 1927. It occupies a substantial two-story building, Doric in design, and having 26 decorative stone columns. The establishment of this store by Sears, Roebuck & Co. inaugurated a new policy of over-the-counter selling. The great success of the company hitherto had resulted from its long-established and nationally-known mail-order business.

Other Department Stores

Paterson has two extensive department stores—Quackenbush Co. and Meyer Brothers. The former was established in Paterson in 1886 and the latter moved there from Newark in 1879. These stores serve a considerable territory surrounding the city. The former was founded by Peter Quackenbush but is now owned by Louis Spitz.



PASTORAL SCENE IN BERGEN COUNTY
View from the Garden of the Lorillard Collection, Seminary at Darlington

Chapter XII

Community Welfare

STATE INSTITUTIONS

New Jersey has never forgotten those of its people who have fallen by the wayside—the child and adult dependents, the insane, the feeble-minded and epileptics, the delinquents, all those who need a helping hand or support and guidance.

Relief of the poor and the afflicted was inaugurated by the churches early in the history of New Jersey, to be later supplemented to an even greater extent by private charitable and relief societies. There is hardly a community in the State today that does not have a social service organization. Institutions supported by private generosity have been established. New Jersey has well-administered schools for the deaf and blind, homes for dependent children, day nurseries and kindergartens, homes for the aged, hospitals and dispensaries, neighborhood houses, and social settlements. Public poor relief by the local community was also inaugurated early, the first poor laws being enacted in 1709.

The State itself was the first to take over the care of the insane, heretofore maintained in local institutions, by erecting the Trenton State Hospital for the Insane in 1848. Gradually other types of patients came under the direct care of the state. In 1888 the State Institution for Feeble Minded at Vineland was established; in 1898 the State Village for Epileptics at Skillman, and in 1907 the State Sanatorium for Tuberculous Diseases at Glen Gardner. New Jersey early recognized its special obligations to its soldiers by establishing the Kearny Soldiers' Home in 1866.

Certain of the penal offenders, who until 1798 were confined in county jails, were transferred to the State Prison at Trenton, which opened that year. To help the youthful offenders, New Jersey established the State Home for Boys at Jamesburg in 1865 and the State Home for Girls at Trenton in 1871.

Out of the various commissions and boards having jurisdiction over the charitable or correctional type of institutions there was developed in 1905 the Department of Charities and Corrections. The outgrowth of this body is the present Board of Control of Institutions and Agencies, which began to function in 1918.

New Jersey in its work with each institution and agency has recognized the importance of a program of treatment, training, social rehabilitation, and prevention, rather than one of mere custody. Through the schools, churches, social agencies, mental clinics, local medical groups, and similar organizations in the communities, insanity and tuberculosis are sought out in the early stages when treatment is more effective; whenever possible the feeble-minded are sent to institutions where they can be trained to do suitable and profitable work, and by the improvement of social conditions, particularly in the homes and by foster-home care, delinquency in many cases is prevented.

Particularly valuable to this work has been the active co-operation of the Department of Education through the schools of the State, the Department of Health, the Department of Labor, and other public and private welfare agencies.

The Department of Institutions and Agencies has general supervision over nearly 40,000 state wards. In the institutions about 17,000 are enrolled. Sixteen thousand are cared for by the State Board of Children's Guardians. Two thousand persons are contacted in one way or another by the State Commission for the Blind, and over 5000 persons in county and private institutions receive State support.

The policy of the two State mental hospitals

at Greystone Park and Trenton is to substitute active treatment for mere custodial care. Each patient is given a comprehensive physical examination, including the teeth, the blood, the eyes, ears, nose, and throat, by a specialist, followed by specific treatment for any abnormalities discovered. The mental examination is equally thorough. When the patient is considered sufficiently improved to warrant a trial visit to his home, the social-service division investigates the surroundings, advises the family as to methods for promoting the best interests of the patient, assists in procuring work, and then supervises the patient for one year before he is finally discharged from the hospital records.

While actual mental deficiency cannot be cured, much can be done through specialized instruction and proper habit formation to make the child better able to take care of himself. With this end in view, the State Institution for Feeble Minded at Vineland established a special school department where the children get the practical and academic training that they are capable of absorbing. Through the industrial department the women make sheets, pillow-cases, pillows, knitted goods, underwear, and stockings. Work on the farm is done by the inmates, who also do the domestic work of the institution as far as possible.

A colony has been established at Red Bank, where about 40 girls are housed in two adjoining homes under supervision. These girls do domestic work in private homes at Red Bank and return to the colony in the evening for recreation and rest. The colony is largely self-supporting.

At the State Colony for Feeble-Minded Males, at New Lisbon, the training and industrial activities include farm and dairy work, clearing the land, canning, baking, reed-furniture manufacture, basket weaving, musical training in band work, and school training in the lower school grades. It is planned to establish colonies from this institution to develop farming activities.

The State Colony for Feeble-Minded Males, at Woodbine, emphasizes habit training, and the ability of each patient is continually checked.

KING'S HIGHWAY LOOKING WEST IN HADDONFIELD

TYPICAL APARTMENT HOUSE AND RESIDENCE VIEW ON THE HUDSON BOULEVARD IN UNION CITY

The newest state institution is the North Jersey Training School at Totowa, opened in 1927, built on the cottage plan, permitting proper classification and grouping of the higher grade feeble-minded girls for the development of home life and habit training.

The Training School at Vineland, although a private institution, has as State wards 65 to 70 per cent of its pupils, placed there and paid for by the counties or by the State. Its reputation is international, partly because of the unsurpassed care and training given the pupils and partly because of its valuable contributions to the study of feeble-mindedness.

A unique institution in New Jersey is the State Village for Epileptics at Skillman, where every new discovery in the treatment and care of epileptics is put to use. Occupational and recreational activities are utilized to the fullest possible extent.

The New Jersey Sanatorium for Tuberculous Diseases at Glen Gardner is regarded as a model institution. It combines medical treatment and education, gives practical demonstration of the modern methods of treating tuberculosis, and at the same time extends the direct benefits of its system to the people at large. Its purpose is to render the patient self-sustaining. The sanatorium has established an extension department organized as a diagnostic clinic to furnish assistance in the more rural sections and in other places requiring trained specialists in tuberculosis.

Realizing the monotony of sanatorium existence a building housing the department of diversional and therapeutic occupation has been erected. The new treatment unit for children is a most important forward step in the preventive health program.

In accordance with the policy to do all in their power to rehabilitate persons, a system of classification has been adopted. Each inmate is studied by specialists from the viewpoints of the medical, psychological, psychiatric, educational and industrial, social history, and background. The plan of training and employment is in preparation for return to the community.

STREET OF MODERATE PRICED HOMES IN RUTHERFORD

POPULAR DESIGN OF HOMES IN AUDUBON AND MERCHANTVILLE

NUTLEY, BLOOMFIELD AND VERONA HAVE STREETS LIKE THIS

NEWER APARTMENT HOUSE ARCHITECTURE IN RIDGEWOOD

All persons paroled from the State Home for Boys, the State Home for Girls, the New Jersey Reformatory at Rahway, and the Reformatory for Women at Clinton are under the supervision of the central parole bureau of the Department of Institutions and Agencies. Employment is secured for parolees and assistance given that they may re-establish themselves in the community and become good citizens.

The New Jersey State Prison at Trenton is a congregate cell-block type of structure, portions of it being over 100 years old. In order to rehabilitate the men, training is given in the English language and in other useful subjects. Among the products manufactured are shoes for men and women, kitchen utensils, sheet-metal work, clothing, tools, dies, automobile tags, wood furniture, and concrete blocks and posts. Additional industries include painting, printing, bookbinding of catalogs and books for the State Library, baking, and coffee roasting. From 100 to 125 men build concrete roads in co-operation with the State Highway Commission. Smaller groups are sent to the several other institutions for general laboring, excavating, and similar jobs.

At the Prison Farm of 1,200 acres at Leesburg, Cumberland County, men do farming, canning, dairying, and pig raising.

The New Jersey Reformatory for Women at Clinton is one of the most successful institutions for women in this country as measured by the stability of the women on parole. It is of the cottage type and is not surrounded by wall or stockade. The industries include farm work, laundry, cleaning and general housework, cooking, sewing, and infant care.

The New Jersey Reformatory at Rahway provides a place where young men may be separated from the older offenders so that the opportunity to reform may be made as great as possible. The institution is a congregate, cell-block, prison-type institution, surrounded by a wall. Training is given in plumbing, masonry, printing, shoe manufacture, tailoring, carpentry, machinery, tool making, blacksmithing, foundry work, painting, musical training through band work, barbering, sheet metal work, metal-bed manufacturing, and electrical wiring.

A new reformatory is being built at Annandale by 150 inmates of the Rahway reformatory who are working under the supervision of skilled mechanics. These men are living in a colony which has been established at Annandale.

The State Home for Boys at Jamesburg is of the cottage type of construction. Each boy is made the subject of an intensive study, and a plan of training is mapped out. This covers efforts at moral and spiritual training by chaplains and workers in the several religious denominations; home- and boy-scout training secured in the cottage where the boy lives with a "family" of 30 to 50 other boys of his age under the direction of a man and wife who are known as the cottage "father" and "mother."

School training is secured in one of two schools, one an academic school for boys who learn best from books, the other a school of manual education for boys who learn best from doing things rather than by book study. Trade training for older boys of adequate ability, and industrial training for those of lesser ability are given. Facilities and opportunities in some 24 vocations are thus provided.

The State Home for Girls at Trenton is also of the cottage type. The training of the girls consists of cooking, general housework, sewing, academic training, typing, stenography, laundry work, power sewing of the factory type, infant care, and personal hygiene. The object is to fit the girls to return to society and to make a satisfactory adjustment in community life.

The New Jersey Home for Disabled Soldiers at Kearny, opened in 1866, is the parent of similar institutions throughout this country. The New Jersey Home for Disabled Soldiers, Sailors or Marines and their wives at Vineland is one of the finest in the United States.

The State Board of Children's Guardians is responsible for the "care and supervision over all indigent, helpless, dependent, abandoned, friendless, and poor children who may now be or who may hereafter be in charge, custody and control of any county asylum, county home, almshouse, charitable hospital-relief or training institution, home or family to which such children may be or may have been committed."

ORANGE ROAD AND HARRISON AVENUE IN MONTCLAIR
America's premier town of wealth and beauty

Under the act to promote home life for dependent children, commonly known as the Widows' Pension Act, children left dependent through the death of a father, or through his incapacity to support them, may be supported in their own homes with their own mother, through funds available from the municipality, or the county, and administered by the State Board of Children's Guardians.

Effort is made to keep in touch with the needs of all blind persons in the State, to provide training for certain pupils in schools for the blind, or to provide training in their own homes and communities.

COUNTY INSTITUTIONS

County welfare work in New Jersey, broadly speaking, includes all types of organized public and private agencies for the care and protection of the dependent, neglected, delinquent, physically handicapped, mentally defective, and diseased. It includes also efforts to prevent dependency and delinquency and to promote wholesome and healthful community life.

Among the private social service and health organizations at work in the counties may be mentioned the Tuberculosis Association of each county, with county and local subdivisions, all co-operating with the State Tuberculosis League; the Health Leagues; the Visiting Nurse Associations; clinics for tuberculosis, mental diagnosis, and other diseases, in communities, schools and industrial establishments; Red Cross units; privately supported homes for neglected and dependent children; child-placing agencies; homes for the aged and indigent, the incurable, the crippled, and otherwise dependent; county and local Y. M. C. A. and Y. W. C. A. organizations, with their educational, recreational and social programs in cities, towns, and rural sections, in industrial and in foreign groups; the Boy Scouts and Girl Scouts, organized by county or local unit; the Needlework Guild of America; the Salvation Army; the Church Mission of Help; Parent-Teacher Associations; Women's Clubs; societies for organized charity; societies for the prevention of cruelty to children; benevolent societies and similar organizations for social or family relief and welfare; Kiwanis, Lions, Rotary, Exchange, and other service clubs; Elks, Knights of Columbus, Masons, Odd Fellows, and other fraternal orders, which have welfare programs; Jewish welfare societies; Catholic welfare societies throughout the State, with diocesan headquarters at Newark and Trenton; church societies; and the American Legion and Disabled American Veterans, and their auxiliaries. The New Jersey Conference for Social Work, with headquarters in Newark, co-operates with local welfare groups in promoting state-wide interest in social questions.

The county as a governmental unit has definite obligations laid upon it in the field of public welfare. The County Boards of Chosen Freeholders have come to exercise important welfare functions through programs of prevention of dependency and delinquency, as well as through the financial support they give to general hospitals, children's homes, and other institutions that care for the sick or indigent within the county.

Thus, hospitals for mental diseases are maintained by nine counties and sanatoriums for tuberculosis by 11 counties. Those counties that do not have institutions of their own contribute to the support of their patients in the institutions of neighboring counties. Counties also maintain almshouses, welfare houses or hospitals for the indigent and chronically ill, and assume the support of some of their citizens as patients in State institutions.

The county adjuster of each county assists persons to enter state and county institutions and aids the overseer of the poor in returning indigent persons to their place of legal settlement.

The "poor law" administration of New Jersey through the modern poor relief law of 1924 provides for the rendering of constructive service. Through it, outdoor relief is a constructive piece of family rehabilitation and aids

RESIDENCE OF COL. ANTHONY R. KUSER, BERNARDSVILLE
Donor of High Point Park and Monument

RESIDENCE OF WILLIAM J. TIERNEY, ORANGE

RESIDENCE OF CHARLES E. LANDERS, MAPLEWOOD

RESIDENCE OF DR. PIERCE A. CASSEDY, SHORT HILLS

MODEL HOMES, THE ORANGES AND VICINITY, SELECTED WITH ASSISTANCE OF THE BOARD OF REALTORS OF THE ORANGES AND MAPLEWOOD

in the prevention of pauperism through trained social work.

The old-time almshouses are giving way to "welfare houses" which seek to provide a real home, not only for indigents, but for persons who can contribute toward their partial support, and to give adequate hospital care to the temporarily and chronically ill.

The State Board of Health works throughout the communities and co-operates with the local boards of health in preventing disease, in solving health problems, in raising sanitary standards, and in enforcing public health laws and regulations. Through its Bureau of Child Hygiene, community demonstrations are given. It emphasizes the importance of examination of pre-school children to detect remediable defects.

The State Board of Education, through county superintendents of education and helping teachers, is extending its social work along preventive lines through the establishment of vocational and continuation schools; special classes for the mentally defective and retarded; night schools for the foreign-born and those employed during the day, and through the extension of the health work in these schools.

New Jersey is in the pioneer group of states which early appreciated the social and economic soundness of applying the principles of probation in its counties to both adults and children.

Atlantic County maintains at Northfield three hospitals for mental diseases, a hospital for tuberculosis patients, and a county home and hospital for the aged and indigent.

Bergen County, at Oradell, has a welfare unit, consisting of a tuberculosis hospital, an isolation hospital, and a home for the indigent. The Children's Home at Hackensack follows modern methods of social work.

Burlington County, at New Lisbon, has a hospital for mental diseases, a tuberculosis hospital and the almshouse. The General Hospital in Mount Holly and the Children's Home are well-managed institutions.

A remarkable unit of institutions is located at Lakeland, in Camden County. The hospital for mental diseases has a capacity of 350 and the tuberculosis hospital 225. The almshouse has a separate unit for its sick patients. A workhouse, as a branch of the county jail, is also here. The county detention home for juveniles is housed in a modern building.

Cape May County's Home and Hospital for the Aged and Indigent is often referred to as a good model. Individual rooms are provided, and the infirmary is in a one-story building. The Cumberland County hospital for mental diseases and the county almshouse are at Bridgeton.

Essex County, with the largest population in the State, has at Overbrook a thoroughly modern curative hospital for mental diseases, with a capacity of 2000. It is equipped to give medical, surgical, dental, physiotherapy, hydrotherapy, occupational therapy, and other treatments.

The County Sanatorium for Tuberculous Diseases at Verona has an average of 275 patients. The County Hospital for Contagious Diseases at Soho has a capacity of several hundred.

The Newark City Home, built in 1916 on the modified cottage plan, is the only public almshouse in the county. Gloucester County's almshouse, in Clarksboro, is beautifully situated and well conducted.

At Secaucus, in Hudson County, are located the county institutions. The hospital for mental diseases, with an average of 1100 inmates, has modern facilities. The tuberculosis sanatorium is one of the best in the State. The well-equipped Hudson County Hospital is practically a general hospital. A smallpox hospital and a contagious disease hospital complete the unit at Secaucus.

In Hunterdon County, with its small population over a large area, social work has been local rather than county-wide. Near Trenton, in Mercer County, is the municipal colony of institutions where complete classification is possible, since it provides a tuberculosis hospital, a home for the aged, a children's hospital for contagious diseases, and an isolation hospital.

The Middlesex County Tuberculosis League maintains an active program and has the co-operation of the Red Cross chapters, local Boards of Health, and similar organizations. The city of New Brunswick, through the attendance

RESIDENCE ON WYOMING AVENUE, SOUTH ORANGE

RESIDENCE OF KIRK McFARLIN, SHORT HILLS

RESIDENCE OF WILLIAM A. KIRK, SUMMIT

L. BAMBERGER & CO. MODEL HOME, SHORT HILLS

MODEL HOMES, THE ORANGES AND VICINITY, SELECTED WITH ASSISTANCE OF THE BOARD OF REALTORS OF THE ORANGES AND MAPLEWOOD

department of its schools, does effective social work and in co-operation with the Woman's Club carries out a playground program.

The Monmouth County organization for social service is the most notable contribution toward county organization in the State. The County Tuberculosis Hospital, at Allenwood, maintains high standards of medical and nursing service and provides for the patients' home atmosphere and comfort. The preventorium at Farmingdale admits some county children.

At Shonghum, in Morris County, is the Sanatorium for Tuberculosis Diseases, with an average of 50. The Welfare House, or home for the aged, is also at Shonghum.

The Ocean County Health Association is well established and co-operates with the State Tuberculosis League in the prevention of tuberculosis. Such hospitals as the Paul Kimball General Hospital at Lakewood, the Mount Pleasant Hospital, and several private institutions have done a great deal to raise the standards in medical service through this county.

At Valley View, in Passaic County, a splendid new county hospital to care for 150 tuberculosis patients is being completed. At Paterson the county maintains an institution for the mentally ill, in connection with the almshouse of Paterson. The city of Passaic also has an almshouse. Both cities have extensive programs of outdoor relief, and have made real progress in general social welfare work.

In Salem County, the County Home for the Aged and Indigent and Mentally Ill is in Penn's Grove Township. A County Memorial Hospital at Salem, supported by county, city, and private funds, is giving excellent service. In Somerset County the County Health Association, which is affiliated with the State Tuberculosis League, promotes an outstanding health program. The Somerset General Hospital at Somerville is notable for its methods and accomplishments.

In Sussex County, between Newton and Branchville, is the County Farm and Almshouse, which has been remodeled and improved. In Union County, at Scotch Plains, is Bonnie Burn, the tuberculosis sanatorium of the county. In Warren County, the Almshouse is at Oxford. The Warren County Health Association is largely responsible for the establishment of a general health program in the county.

The Ann May Memorial Homeopathic Hospital, incorporated October 27, 1905, is in Spring Lake near the ocean front, and from its upper floors the patients have a view of the ocean. It is a modern hospital and is a highly organized and efficient institution. The medical profession has given of its best to create and maintain it, and it is the only Grade A hospital on the New Jersey coast between Long Branch and Atlantic City. In addition to the regular medical and surgical services, it has departments of obstetrics, pediatrics, orthopedic, and X-ray.

There is in the State of New Jersey a keen and understanding interest in the problem of providing institutions for the care of the sick and maladjusted. There are countless citizens actively interested in this problem and many public officials prepared to accept their responsibility for constructive action. The types of institutions needed, the policies and programs necessary to successful operation, the cost to the taxpayer are all subjects debated at each annual session of the Legislature, while the details of their administration occupy much of the time of the governing bodies of the many political units within the State, particularly of the County Boards of Chosen Freeholders.

The 16,000 children cared for comfortably and happily, in private homes but as public wards, under the supervision of the State Board of Childrens' Guardians, owe the origin of this plan 30 years ago to Emily Williamson, of Elizabeth. Most of the counties in New Jersey now employ, with undisputed advantage to their social rehabilitation work, probation officers.

Along with the State and county institutions taking care of all ages and both sexes of the ill and the needy, there are many remarkable private or semi-private institutions. Among these the scores of homes for children stand out as notable. Representative of these might be mentioned the Bonnie Brae Farm for Boys at Millington.

A dozen years ago New Jersey had no home or institution, non-sectarian in service to boyhood, to which the needy and imperiled boy could be sent. For the definitely delinquent boy there was the State Home for Boys at Jamesburg, and for the very young child the Orphan Home sometimes met the need, but for the half-grown boy, not eligible to either of these institutions, no desirable provision had been made. Judge Harry V. Osborne saw this need, and Bonnie Brae was founded. It now cares for 60 boys in a well-ordered, modern institution, homelike in character. Mention of this will suffice for the many other like institutions and childrens' homes located in various parts of the State.

PINE BARRENS BETWEEN CHATSWORTH IN BURLINGTON COUNTY AND BARNEGAT IN OCEAN COUNTY

Known as "The Plains." One of the most primitive regions remaining on the Atlantic Coast. Deer congregate in these hundreds of square miles of white sand, stunted pines, scrub oak and holly trees. A desolate region—yet romantic and alluring.

Chapter XIII

New Jersey—Tomorrow

Although our present deficiencies are too numerous to catalog, not one of us in a thousand would care to go back to the inconveniences of the years that have passed. It was not so long ago when Michael Faraday was putting together bits of wire and steel in order to solve the problem of conveying electric current through a metal conductor over a short distance. He did not even have any electricity to work with except that which he obtained from batteries similar to the ones we use for doorbells. Sir Walter Scott and Lord Byron were making fun of the crazy notion of getting light and heat from gas produced by the burning of coal. Ruskin drove through England in a mail coach as a protest against the nonsensical railway.

Sugar was recognized only for its medicinal value. The discovery of oxygen was the sensation of the day, and no one had ever heard of the periodic system of the chemical elements. The dandies in Europe wore shoes equipped with high red heels, carried muffs and walking sticks, and even went so far as to wear patches of court-plaster on their cheeks. Sarsaparilla and sassafras were heralded as wonderful cure-alls. Tobacco was considered a plant of rare virtues, and as a remedy for asthma, it was recommended that the leaves be chewed and the juice swallowed.

America's growth, only then commencing, was painfully slow. For a century diseases of filth took a heavy toll of human life. Urban atmospheres were saturated with steaming abominations from noisome liquids that filled gutters and pools on every side. Fifty generations of people throughout the world had gone on contentedly getting light from lamps that burned only vegetable oils.

It takes a lot of imagination to draw an accurate comparison between the past and the present, but it is only in this way that one can develop an understanding of current problems and chart the road ahead. It was just a short while back when we cranked our telephones; when kerosene provided our bright lights; and when even ma rode a bike. Hoop-skirts, bustles, pill-box hats and cameo brooches were all the style in feminine attire. Men wore padded cravats, spring-bottom trousers, and derby hats with linings that would have done credit to the handiwork of an expert casket trimmer. Johnny wore copper-toed boots designed to fit either foot, and the "assifidity" bag that hung around his neck was expected to protect against the evils of disease. Architecture was a study in cubes, and watermelons were round rather than oblong.

That was the era when most every house had a fence around it and the streets were lined with hitching posts and trees. No home was complete without tidies, gaudy mottoes on the walls, coffee cups having mustache guards, and at least one squeaky chair that rocked on stationary runners. Any talk concerning women's rights, female doctors and co-education brought forth tirades about the "shrieking sisterhood" and "he girls." The swain who possessed a horse and buggy and could strum a guitar had the chief qualifications of a village sheik.

It was no longer ago than 1876 when two men conversed for the first time over a long-distance telephone. Up until 1883 we did not even have an accurate time-keeping method. Hours were reckoned from sunrise to sunset and many people set their watches by the noon shadow on the sun dial. Trains operating between large cities started on one time system and arrived at their destination on another. Railroad dispatching was in its infancy, and few travelers complained if they were no more than an hour late.

What a change has taken place! The other

RADIO TELEPHONE RECEIVING STATION OF THE
AMERICAN TELEPHONE AND TELEGRAPH COMPANY AT NETCONG, MORRIS COUNTY

ANTENNA OF THE RADIO TELEPHONE RECEIVING STATION AT NETCONG

day a man in New York lifted the receiver of his telephone from the hook and was in instant communication with a friend in Holland. When Henry Hudson sailed away from that country more than 300 years ago seeking a new route to India, he sailed west for six months before dropping anchor in what is now the harbor of New York. Truly, science has transformed months into minutes so far as communication is concerned.

There was never any greater bunk than the foolish talk about "the good old days." Compared with the customs and comforts of the present era, the life of yesterday was crude indeed. Now we have five new inventions a minute. Ours is a nation on wheels, and the space about us has been transformed into a carrier of music and speech. We navigate the air, take pictures of the insides of our bodies, broadcast photographs and photograph music. We refrigerate with heat, rear oysters from artificially fertilized eggs, and measure the length of thought waves sent out by the human brain. We make furniture out of steel, sugar from corn, and motor fuel from molasses.

A machine called the "brass brain" predicts what the tides will be in any seaport in the world at any time. It has 15,000 separate parts and does the work of 60 mathematicians. A new electric microphone is so sensitive to sound that one can hear a worm chewing at the interior of an eight-inch apple. An appliance used by power-and-light companies foretells the approach of a storm 50 miles away. A new carbon-monoxide gas indicator is so perfect in operation that it will register the amount of carbon monoxide thrown off in the single puff of a cigarette.

Today we hear the roar of the mail plane over the route of the old Pony Express. On the silver screen we see the sun pierce the clouds and buds break into flower. Marvels like radio are the playthings of school boys. Instead of talking over a single wire with grounded circuits, we talk through cables having a diameter of nearly three inches and carrying more than 2000 wires. Gas that had one use and cost six dollars now has 5000 uses and costs one dollar. Pages might be filled with an astounding recital of recent amazing developments in the fields of research and invention. Truly, the fiction of Jules Verne has become fact.

We are no longer workers, but rather masters of machines. Now when we arise we do not ask, "What must I do today?" but "What must I make steam, gas, electricity or compressed air do for me today?" It is America who is showing the world the way in employing automatic methods for the purpose of raising wages, shortening hours and lowering prices. We know that our machine civilization has deficiencies, but we do not accept the idea that it has developed an "inhuman materialism." How foolish to say that the worker of the Middle Ages was treated more humanely than the machine operator of the present time.

One look at the Orient where the handicraft of past ages continues supreme will prove that America's advance has been upward. We have merely transferred the craftsman from the shop to the laboratory, where he is doing a better job and exercising a wider influence than ever before. Nothing has been lost by banishing superstitions and fears once essential to the perpetuation of Christianity. As one has asked, "Is feeding the multitude by mass production more materialistic than feeding it by a miracle? Is it not wiser to prevent famine by creating world-wide systems of food distribution than by offering sacrifices to the rain gods for the purpose of ending a drought?"

The future of New Jersey is inseparable from the future of America. This is not true to the same extent of all the states of our Union because of existing differences in the two elemental factors—location and climate. In looking to the years ahead, one must think in terms of tomorrow's conditions. It is necessary to discover the direction and character of current trends and the possibilities that lie in utilizing forces and resources that are permanent.

Prosperity built on exhaustible supplies of mineral resources is transient. But that created by the benefits and advantages resulting from great ocean harbors, a coast line unmatched in the attractiveness of its beaches and recreational sites, a soil famed for its variety and fertility, a climate that energizes the worker and permits outdoor operations to continue

PLANE USED AT WHIPPANY FOR EXPERIMENTING WITH TELEPHONY FROM GROUND TO AIRPLANES

HOME OF LATE THEODORE N. VAIL, HEAD OF BELL SYSTEM
Bequeathed to Morristown for Municipal Building

ANTENNA AT WHIPPANY
Bell Telephone Laboratories

WHIPPANY EXPERIMENTAL LABORATORY
Where telephoning to and between airplanes is being developed for commercial use

the year round, and the very closest proximity to the world's greatest markets, is the sort of prosperity that will show rapid and enduring growth.

Man is subject to the same laws which govern the rest of the organic world. He has what scientists call a "climatic optima," or desirable temperature average, which New Jersey approaches as closely as any of our states. Abnormal cold brings a sapping of human energy and abnormal heat produces chronic exhaustion and a disinclination to work. A people living where the temperature is nearer to the optimum than to the extreme limits has all the advantages in the struggle for success. The greatest authorities on climatic influences place the climatic optima for the United States at 66 degrees.

But temperature is not everything. There are also the factors of humidity and variability. Weather that shows almost no variation at all, as well as weather that is subject to violent changes, is highly undesirable from the standpoint both of individual accomplishment and general health. The best possible day is one that has dew at night with a relative humidity of about 60 per cent. It is not accidental that maps of climatic energy are almost identical with maps of human health and progress. All of the conclusions here set forth are founded on proved statistics covering mortality and industrial production, and they explain why the Jersey climate is a permanent and invaluable asset to the State.

New Jersey's position on the Atlantic Coast insures for it an unequalled opportunity to become the center of a great manufacturing industry given over to the refining of immense supplies of various raw materials coming to this country from overseas. The State is destined to become the hub of America's greatest developments in the fields of heat and power. Here the existing conditions are most favorable to the consummation of the dreams of scientists and engineers respecting the creation of immense systems of interconnected super-gas lines and interconnected super-electric lines. The world's finest bituminous coals are in West Virginia and Kentucky and these transported by water will supply the raw fuels for the great carbonizing plants that will dot the Jersey coast.

These byproduct ovens will operate without any discharge of smoke or fumes. They will not only supply gas of high heating value for transport through pipes under high pressure to all parts of the State, but they will produce a multitude of substances from coal that will reduce the cost of medicines, dyes, solvents, lubricants, preservatives, paints, explosives, fertilizers, perfumes and insecticides. New Jersey will be the very heart of a movement in the handling and use of fuels that in the next 20 years will doubtless surpass all the advances in this field of effort that have taken place since that day, 150 years before Christ, when Hero of Alexandria first noted the power of steam, but did not understand the phenomenon at all.

In order for any State to make cheap heat and electricity instantly available to everyone at the turn of a cock or the touch of a button, it is essential that there be not only favorable transportation facilities for the raw fuel, but that there shall be a distribution of population sufficiently dense to make such a plan economically possible. Furthermore, industry tomorrow will give primary thought to the permanence of its energy supply, and there is no permanence in any source of heat now available except coal. This basic fuel will be so carefully resolved into its various constituents that a commercial market will be found for even the ash that the coal contains.

New Jersey also has an equal opportunity with many other coast states to capitalize the values of the ocean. Already the sea yields America more than a billion dollars' worth of products yearly. At present oysters rank first as a sea crop. Research is making this business more of a farming operation than a fishery. Doubtless before long seed oysters will be developed in a hatchery much as trout are now propagated. Inedible fish will be made into oil, fertilizer and meal—the oil being used for tanning leather, lubricating watches and clocks, and serving as a substitute for linseed oil in paints.

The skins, scales and waste of certain fishes will be utilized in the manufacture of leather,

LOOKING OVER WORLD'S GREATEST POPULATION CENTRE FROM EAGLE ROCK, ESSEX COUNTY

DEMONSTRATION TRAIN
State Department of Agriculture

DUCK HUNTING ON BARNEGAT BAY

DUTCH OVENS ON PICNIC SITE, ORANGE MOUNTAINS

FLOAT OF NEW JERSEY STATE CHAMBER OF COMMERCE IN THE BOARDWALK DEDICATION PARADE, OCEAN CITY, JULY 4, 1928
Such decorated floats comprise the annual pageants at New Jersey shore resorts

liquid glue, imitation pearls, and dozens of other useful products. Air bladders will supply isinglass. The truth is that out of the ocean will come wealth untold, and the states which are able to participate in these riches will be fortunate indeed.

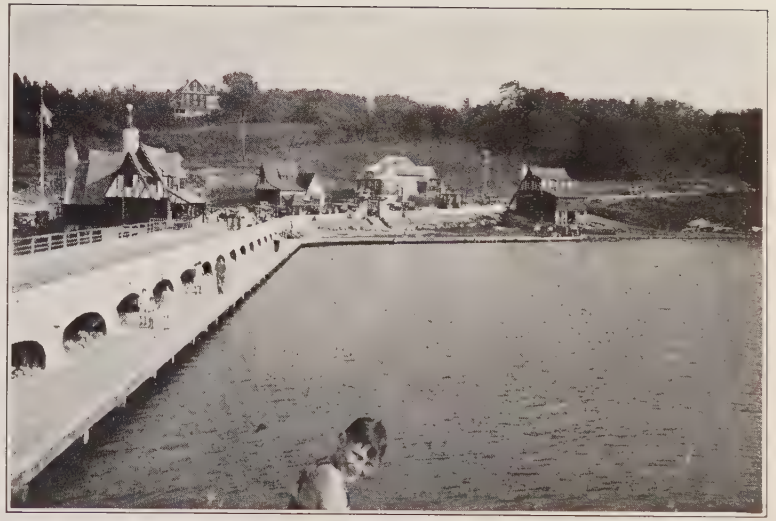
The agriculture of New Jersey will profit from its diversity of soils and elevations. Scientific studies have brought us to the edge of an amazing era wherein there will be developed an entirely new conception of agriculture. Technical disclosures will open all eyes to the truth that there is no such thing as waste land. Out of Jersey sand will grow dozens of new things that cannot be propagated elsewhere. In the rich soil of her highlands will be new fruits combining the exotic flavors of the citrus with those of products native to the temperate zone. Successful experimentation in breeding a new kind of orange has indicated clearly the possibilities of greatly extending the zones of plant growth.

Farming is on the way to becoming a highly automatized and technical profession. The benefits of cheap heat and power to the industries of New Jersey will be duplicated in the State's agriculture. Electric lights are already being used to get the hens up earlier on winter mornings and thereby increase the production of eggs. Hand work will disappear from almost every department of farm life. Ingenious machines will separate good berries from bad. Various kinds of rays will be employed to treat seeds to bring about increased yields. Ordinary manufactured gas will speed up the ripening of fruits and probably aid in developing a higher sugar content in such things as melons. Experiments with static electricity in the process of extracting nitrates from air make it appear likely that electrical energy secured from the atmosphere will be sent through the soil to purify and nurture vegetation.

New methods and new devices will multiply production enormously. One farmer found that his 17 cows would not drink sufficient water when its temperature was very low. He installed a combination electric pumping and heating apparatus so that the water might be slightly warmed before being supplied to the cattle. The result was 430 pounds more milk a week. A thoughtful fruit grower discovered that he could preserve his perishable products by dipping them in rubber latex—the milk of rubber—which makes them airtight and permits the fruit to be shipped long distances without refrigeration. Under this plan strawberries traveled 14 days without spoiling. The rubber coat is easily peeled off, and this means that delicate products may soon reach distant consumers with all their delectable flavors intact.

Everything is being made to serve the needs of man. Even the desert cactus is having its fruit converted into rare confections and its juices into liquid fuel. Corncobs are not only being made to yield furfural, a substitute for formaldehyde, but are being converted into a synthetic wood that can be nailed, glued or turned in a lathe. In addition to getting alcohol, starch and yeast from potatoes, this most common of farm products can be transformed into a powder that will bleach juices and liquors. This same powder mixed with oil of turpentine even makes a good shoe polish. A superior grade of potash can be obtained by burning the stalks of sunflowers. When

CHILDREN'S PLAYGROUND IN HUDSON COUNTY PARK



ONE OF MANY ARTIFICIAL PLEASURE LAKES IN NORTHERN COUNTIES

POPULAR BAND CONCERT ON LAKE SHORE—BRANCH BROOK PARK

TENNIS COURTS AT ELIZABETH—UNION COUNTY PARK

properly handled this plant can be made to yield a potash averaging 175 pounds to the acre.

Hundreds of new products will come from New Jersey's farms. Truck gardening will be completely automatized. Just as we now have cotton-picking machinery, so will we have clever devices to pick such things as peas and beans and to get other crops out of the handicraft stage. Our supply of rubber will be extracted from home-grown plants, and the carbon-dioxide waste that now pours from the chimneys of our great factories and mills will be utilized for fertilizing purposes or for conversion into artificial ice. Machinery will do for farming what it has already done for manufacturing.

And talking of soil fertilization, this brings us back to the carbonizing plants that will extract the values from coal. Out of these great ovens will come many things now regarded in most places as pure waste. The sulphur from the coal will be used as an insecticide or fungicide, particularly in grape culture; as a dust to shake on seed potatoes to accelerate growth; as an agent to counteract soil alkalinity; and as a substance to combine with phosphate rock in the production of a plant food.

The leveling of walls and the close interrelation that will exist between New Jersey's industries in a near tomorrow, are clearly indicated by current developments on every side. For example, in the process of purifying the gas manufactured from coal, there is a waste product called sodium-thiocyanite. Recent studies have shown that when this substance is employed as a dilute solution, it speeds up the germination of potatoes that have been sprayed or dipped. This means that the farmer can market his potatoes earlier and get more money for them. This tendency to create values out of things that were worthless will be carried to a point where waste in the wide world of materials will be practically unknown.

The scientific advances that will be made during the next few decades will represent more progress than had previously been made in all recorded history. We shall probably see the $150 airplane. But for mass transportation through the air, the vehicle that will serve our needs will be the airship which, like the ocean liner, floats in its own medium and gains in effectiveness as the size increases. The plane is supreme in speed; the dirigible has most of the other advantages. Soon the citizen of New Jersey who has a fortnight's holiday will be able to spend 10 days of it in Europe.

Ocean-going vessels fitted with gyroscopes will double the speed of trans-Atlantic travel. New and far more sensitive films will make it possible to record the natural tints and colors when a motion-picture is being photographed. Then the color of a woman's eyes and hair, the tint of the sea and the hues of the rainbow itself will be a natural part of every motion-picture play. Rapid advances in the arts of radio and television will break down all of the barriers of distance in the fields of sound and sight. We will give a fragrance to hitherto odorless plants; pour houses into shapes instead of building them; convey sound by means of light; use various types of rays to make surgery bloodless; forecast floods and violent weather changes far enough in advance to reduce property losses to a minimum; transmit power without wires; and eliminate insect pests by controlling heredity and developing a sex situation that produces a vast majority of males, thus causing an early extinction of the species.

We will stop building our houses around a chimney, for our heat and power will come to us through pipes or over wires. All buildings will be insulated and the air we breathe will be dustless and properly humidified. Instead of merely heating air, we will manufacture weather indoors, thereby largely reducing the cost to life and industry from the greatest of all curses—the common cold. The same system that gives us warm air in winter will provide cold in summer, and everyone will devote as much attention to the moisture content of the indoor atmosphere as to its heat content. The abolition of unhygienic heating will put an end to the rapid rise of the cosmetic index which has resulted from the fading of the natural color index of human complexions.

No longer will lakes, rivers, roads and railroad stations be the only factors in determining the location of towns. Through eliminating barriers and bridging gaps, the airship will

PITMAN GOLF CLUB FAIRWAYS AND GREENS, POPULAR COURSE OF SOUTHERN PART OF THE STATE. ALEXANDER H. FINDLAY, CHAIRMAN OF THE BOARD, INTRODUCED GOLF IN THE UNITED STATES, APRIL 4, 1887

change our motives and revolutionize land values. In many places the mountain top, now worth but little, will be more valuable than the fields in the valley below. Air cities will spring up as rapidly as did seaports. Landing platforms will cover the roofs of public and private buildings. Non-stop mail deliveries by planes flying a mile up in the air will be a reality. Transportation generally will be under the control of radio, which will operate our trains and manipulate switches. The railroad supervisor at the central station will be able to visualize on the screen in his office the actual movement of any train on the line.

The next few years will be a period of great activity in railroad electrification, with the most intense developments centering in New Jersey. The Lackawanna Railroad is already engaged in the electrification of its lines from Hoboken to Dover, an undertaking of immense benefit to the traveling public and to many residential centers, but of first importance is the plan of the Pennsylvania Railway which calls for the electrification of 1,300 miles of track in America's most densely populated region—New York City to Wilmington, Delaware. This project, when completed, will eclipse all previous accomplishments of a similar nature, not only in miles of track electrified, but in the number of trains affected, terminal operations involved, and size and amount of equipment required.

The entire job will cost approximately $100,000,000 and will take seven years to complete. Construction will be done in sections, each section being put into operation as soon as finished. When electrification has been accomplished, the necessary power will be purchased from outside concerns in order to encourage industrial development in the territory served by the railway. The immediate result will be an acceleration of industrial activity throughout New Jersey. Because of its strategic situation, this State will be the first to electrify its system of railways, thereby eliminating that costly nuisance—the smoking locomotive.

All about us are possibilities unrealized. Important phenomena of an amazing nature now touch our lives at every turn without our knowing it. Succeeding groups of students in dozens of college laboratories went ahead for years operating Crookes tubes in their study of physics not knowing that every time this apparatus was put into action it gave off X-rays. Röntgen later discovered these rays purely by chance and then all the Crookes tubes were hastily pulled out and hundreds of people easily repeated the famous experiment. The greatest discovery of this generation may be made by someone who can lay no claim to an intimate knowledge of science. Truly there are more things in heaven and earth than are dreamt of in our philosophy.

It is for this reason that the future of New Jersey cannot be visualized by merely multiplying and enlarging the latest things of our own era. A mere handful of scientists, just a few thousand out of two billion humans, now hold within their grasp the destiny of humanity. Race betterment is only just commencing in real earnest. In this thought lies a serious threat to all those branches of business where the leaders stubbornly persist in opposing the forces of change. Never were foresight and a willingness to meet new conditions so necessary. New measures designed to improve health, comfort and convenience will be determining factors in shaping the practices of commerce and industry.

Sewage-treatment plants now serve only a fraction of the people and this permits the wastes from hundreds of industries to run away freely and serve as a menace to health. Managements who do not prepare for a speedy correction of this condition will be heavily penalized. The same thing is true with respect to unnecessary noises. New devices for measuring sound have removed this problem from the realm of mere guessing. We can now estimate with reasonable accuracy the actual cost of the noise nuisance in damage to health and in the distraction of attention. A noisy environment means the use of more energy in talking. Night noises cause a loss of sleep. Conversation on a railway train or in the subway requires an expenditure of more than 100 times as much energy as in a quiet room.

The architects of tomorrow in designing

A QUIET FISHERMAN'S RETREAT IN ESSEX COUNTY

BLACK DIAMOND BLACKBERRIES—MONEY CROP OF HAMMONTON

LATEST STANDARD TYPE OF STATE HIGHWAY BRIDGE CONSTRUCTION

ENTRANCE TO BRANCH BROOK PARK, NEWARK

buildings will no more think of neglecting to consider sound-absorbing measures and devices than they will provisions for adequate supplies of heat and water. Street and subway cars will have noiseless wheels and silent coupling connections. In office and factory every machine from typewriter to drill will operate in comparative quiet. This will accelerate office routine, conserve human energy, reduce costly mistakes and release the body from its present use as a sound shock absorber. Soon noise producers will be banned completely, and those ignoring the current trend will lose heavily.

New Jersey is a State of destiny by virtue of the permanence of its established assets. It can never become the geographical center of American territory or population. But it will continue to be the heart of the world's most intense and highly developed industrial life. The picture of its future discloses the rapid development of the magic art of catalysis to a point where the chemist will join hundreds of chemicals with other hundreds in the production of strange and useful compounds; the transformation of farming into a year-round business free of crop failures through the introduction of measures that afford control of natural elements and other factors that are now a menace; and a highway system that will include three classes of roads—primary or arterial highways, secondary roads with feeder lines, and local roads to take care of short-haul traffic. The carrying out of this program will give new leases of life to small towns away from water and railroads.

New thoroughfares will be cut through built-up sections, and old streets widened. It costs more not to have wide roads than to build them. Municipal reconstruction will include two-level sidewalks, bridges for pedestrians at busy intersections, escalators and ramps to connect streets that lie one above the other, removal of signs and shrubbery that obscure vision, express routes through and around towns and villages, making it possible for fast-traveling tourists to avoid meeting traffic; and a rapid extension of the no-parking zones. One automobile standing at the curb narrows a street for an entire block.

A further result of rapid traffic growth will be new building regulations limiting the number of tall structures on each city block. The skyscraper has increased the floor space in many communities as much as six times, with the result that six times as many people are discharged every day on that section of the street which the building fronts. No system of underground tubes will take care of such growth. Burrowing into the earth is far more costly than growing into the air. Expensive subways will probably end up by supplying space for sewers, electric conduits, water and gas pipes, and other essential service lines, eliminating the necessity for constantly tearing up streets in order to repair and enlarge existing facilities.

The tools and money now available to the engineer and scientist render undertakings possible today that would have been looked upon as fantastic dreams two decades ago. New Jersey's meadows that lie in the very heart of the great metropolitan district will be reclaimed and converted into useful land worth hundreds of millions of dollars. Here almost at the feet of New York is one of the richest unworked gold mines in the world. No insurmountable engineering problems are involved. Here might be built the most beautiful and most utilitarian city that the mind can conceive—a city constructed in conformity with fixed plans that include not only all the benefits of modern science, but take advantage of developments that are now only matters of anticipation. A dream city, perhaps, but one so located that it might be made to produce a revenue sufficient to extinguish a large part of the indebtedness of the entire State.

It is now essential that we give thought to the possibilities of astounding developments that will shape the lives of our children's children. Viewpoints must be broadened to recognize a form of life with universal co-operation, free of idleness and the waste of duplicated effort, free of social recognition that is based on nothing more than financial success, and free of any argument on the point that the word "good" means everything that adds to the total happiness of the human race. Although innovations of great public benefit may be retarded by shortsighted opposition, the

ROLLING HILLS AND PLAIN ON THE ROAD FROM SINGAC TO POMPTON

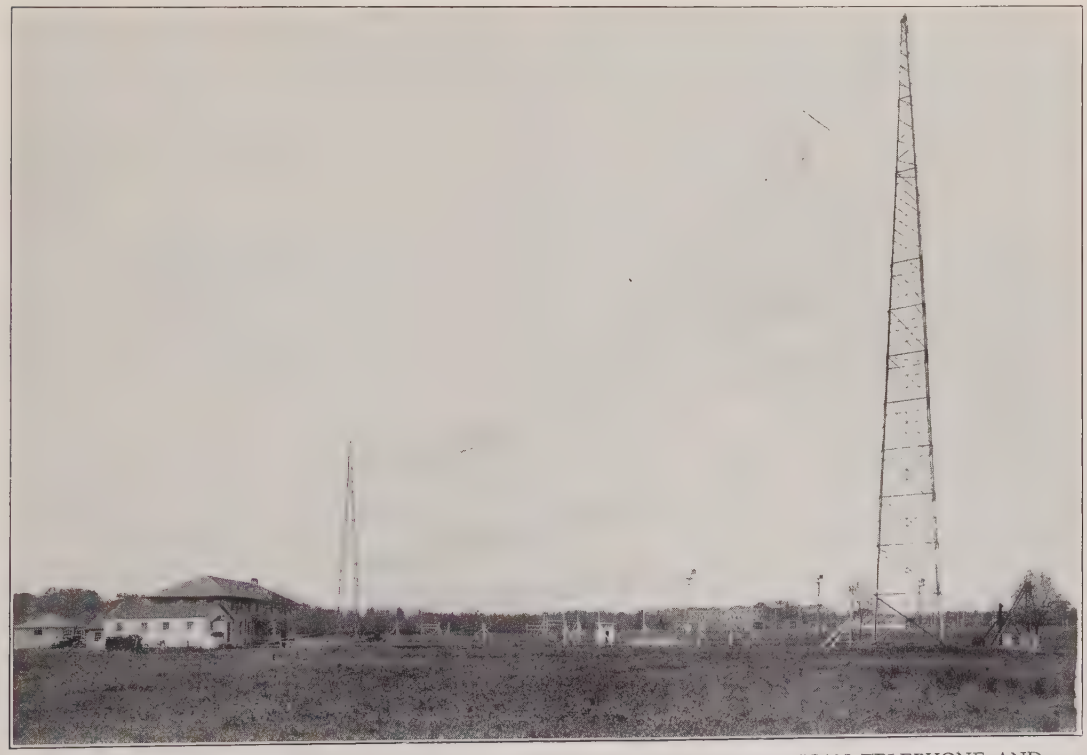
WINDING CONCRETE ROAD THROUGH THE ORANGE MOUNTAINS IN ESSEX COUNTY

advantage is always with the fellow whose aims and plans make careful provision for the inevitable developments of the future. That is why great leaders of finance seek to invest in corporations that provide for continuous research.

Much has happened since that August afternoon in 1826 when John Stevens built a wood fire in the odd-looking locomotive that was to startle the natives by traveling around two concentric circles on the wooden rails that had been laid down upon his New Jersey lawn. This epochal accomplishment of Stevens not only gave birth to America's fifty billion-dollar transportation industry, but it started us into an age of metal contrivances that have greatly multiplied the effective range of human senses and relieved man's muscles of dreary drudgery. Out of New Jersey's famous laboratories will come other thousands of automatons and scientific revelations to maintain the State's prestige as a leading benefactor of humankind throughout the earth. Right now her citizens are delving deep into such profound secrets as the production of cold light and the manufacture of rubber from domestic plants.

New Jersey is fortunate in that the mental attitude of its people is expectant and receptive. Any other frame of mind today means industrial death. No business or individual has the power to control the moment of every crisis. To act any time, the leaders of business and industry in a great state must be ready all the time. On every side are the graves and dead hopes of skeptics who said "It can't be done."

Great wisdom comes out of the past if we can believe the story of the Emperor who called a conclave of scholars for the purpose of reducing the total knowledge of the ages to a four-word summary. After great deliberation, the report of the ancient convention read: "This, too, will change."

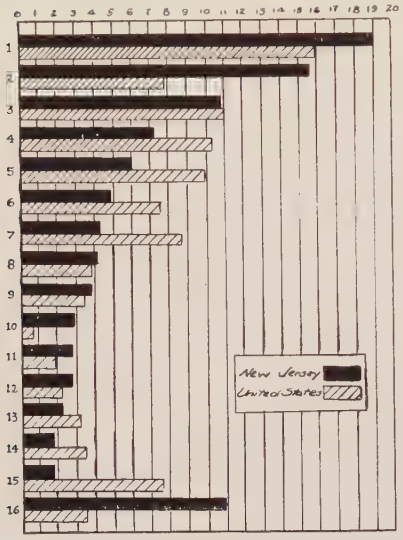


DEAL BEACH EXPERIMENTAL STATION AND ANTENNA OF THE AMERICAN TELEPHONE AND TELEGRAPH COMPANY

Where ship-to-shore telephone communication preceded transatlantic telephone service. Used for first commercial short-wave transmitting in overseas telephony. Will ultimately handle all overseas telephoning to the United States. In addition to the Netcong Station, the Bell System maintains a long-wave transmitting station at Rocky Point on Long Island and a receiving station at Houlton, Maine. Commerical service planned between Deal and South America.

Comparison of Relative Importance of Industries in New Jersey and in the United States Ranked as Per Cent of Total Value Added by Manufacture 1923

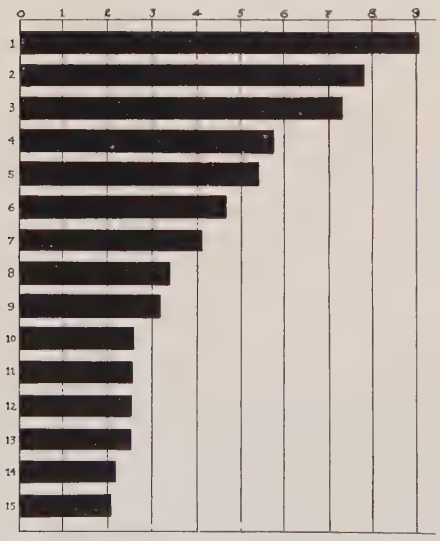
Per cent of total value added by manufacture



1. Textiles and their products. 2. Chemicals and allied products. 3. Machinery, not including transportation equipment. 4. Iron and steel and their products, excluding machines. 5. Food and kindred products. 6. Transportation equipment: air, land, and water. 7. Paper and printing. 8. Stone, clay, and glass products. 9. Metals and metal products, other than iron and steel. 10. Musical instruments and phonographs. 11. Rubber products. 12. Tobacco manufactures. 13. Leather and its manufactures. 14. Railroad repair shops. 15. Lumber and allied products. 16. Miscellaneous industries.

Leading New Jersey Industries Ranked by Value Added by Manufacture for 1925

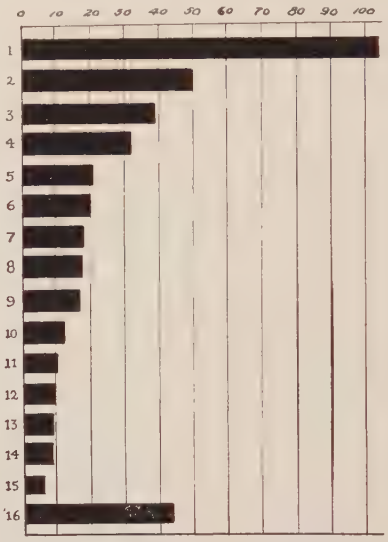
(Millions of dollars)



1. Electrical machinery, apparatus, and supplies. 2. Silk manufactures. 3. Foundry and machine shop products. 4. Dyeing and finishing textiles. 5. Chemicals, not elsewhere classified. 6. Petroleum refining. 7. Tobacco manufactures, cigars and cigarettes. 8. Printing and publishing. 9. Motor vehicles. 10. Canning and preserving, fruits and vegetables. 11. Worsted goods. 12. Iron and steel, steel works and rolling mills. 13. Bread and other bakery products. 14. Rubber goods excluding tires, inner tubes and belting. 15. Gas, manufactured, illuminating and heating.

Number of Wage Earners Employed in New Jersey by Industrial Groups 1925

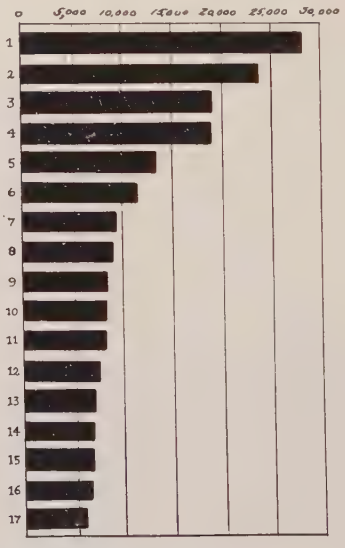
Average number of wage earners in thousands



1. Textiles and their products. 2. Machinery. 3. Chemicals and allied products. 4. Iron and steel and their products. 5. Stone, clay, and glass products. 6. Food and kindred products. 7. Transportation equipment. 8. Paper and printing 9. Metals and metal products. 10. Rubber products. 11. Railroad repair shops 12. Lumber and allied products. 13. Tobacco manufactures. 14. Leather and allied products. 15. Musical instruments and phonographs. 16. Miscellaneous industries.

New Jersey Industries Employing Over 6,000 Wage Earners 1925

Average number of wage earners



1. Silk manufactures. 2. Electrical machinery, apparatus, and supplies. 3. Dyeing and finishing textiles. 4. Foundry and machine shop products. 5. Worsted goods. 6. Chemicals, not elsewhere classified. 7. Car and general shop construction, steam railroad shops. 8. Petroleum refining. 9. Cotton goods. 10. Rubber goods, not elsewhere classified. 11. Tobacco, cigars and cigarettes. 12. Iron and steel, steel works and rolling mills. 13. Ship and boat building, steel and wooden. 14. Pottery, not including porcelain ware. 15. Clothing, men's. 1. Printing and publishing. 17. Bread and other bakery products.

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